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THE ARCHITECTURAL RECORD

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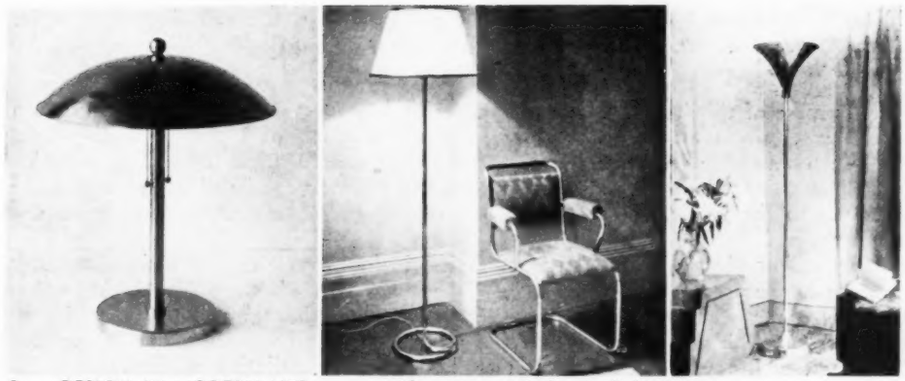

From DESIGN IN MODERN LIFE . . . Three types of electric light fixtures

DESIGN IN MODERN LIFE. *Edited by John Gloag. George Allen & Unwin, Ltd., Museum Street, London.* 138 *pages. Illustrated.* 10*s.*6*d. net.*

Most of the chapters in this book are based on a series of radio discussions during 1933 (in London) on "Design in Modern Life," between experts in the various subjects dealt with, and a questioner. Mr. Gloag, who acted as a questioner in three discussions, has edited most of these talks and completely revised them, together with entirely new additions, as essays for this book.

His opening chapter, entitled "Who Knows What the Public Wants?", says that the architect, the designer, the craftsman surely do not, since the public itself has no idea of what it wants. But the public must learn a discrimination in the things it buys as it usually does in the things it wears.

"The Design of Dwellings," by E. Maxwell Fry: Shelter is a primary need and the realization is finally apparent that the house—any house—has to be planned for bare needs, for comfort, for fine living, and it must be built with the materials most easily available and to the limits of structural economy. Standardized materials, steel, concrete and glass are made for modern housing. And machines, made to work for man.

"The Living Room and Furniture Design," by Gordon Russell: Changing social customs and increasing time for recreation have resulted in much less time being spent in the house than formerly. The function of the living room is overlapping owing to the smaller family and smaller apartment of today. To conserve space there is a demand for less and smaller furniture, dual-purpose furniture, built-in furniture and standardized unit furniture. Adequate lighting is essential; the furniture should be good, and comfortable. The aim of designers should be to produce furniture which is functionally perfect and pleasant to look at in as small a range as will meet most needs.

"Design In the Kitchen," by Eizabeth Denby: The work center of the house is in the kitchen, and its planning and design will either help or retard the housewife. The kitchen should, if possible, get the morning sun; as much light and air as possible should be admitted. Light, cheerful walls and arrangement of equipment to save steps are desirable. Stainless steel, enamel, aluminum, fireproof pottery and glass are recommended for utensils.

"The Design of Illumination," by A. B. Read: Lighting should be intelligently planned when a house is being built, and the use of simple, well-designed standardized fixtures is most desirable. Light walls and ceilings supplement artificial lighting, while the source of light itself should be as inconspicuous and unobtrusive as possible. The fitness of the light for its purpose should be well considered for every room in the house.

"Design in Public Buildings," by Robert Atkinson, "The Design of the Street," by Frank Pick, and "Design in the Countryside and the Town," by E. Maxwell Fry, are devoted to typically English examples. Public buildings are chiefly schools, theaters and hospitals which call for specialists in their fields; the traffic arteries control the streets, which must have shape, definition and direction; and town planning should be a long thought out, planned and perfected process.

There is also a chapter on "Clothes and Design," by James Laver; Frank Pick, who is president of the Design and Industries Association, completes the essays with "The Meaning and Purpose of Design," in which he says that design is the expression of the designer; it should be beautiful and functional.

Three large progress and period charts, designed by Raymond McGrath, are folded into the book. They deal with the development of utensils and furniture from 1500 to the present time.

INDUSTRIAL ART EXPLAINED. *By John Gloag. George Allen & Unwin, Ltd., Museum Street, London.* 192 *pages.* 16 *plates and other illustrations.* 5*s. net.*

The purpose of this book is to show how design has affected (1) the accommodation of industry, or *industrial architecture;* (2) the products of industry, or *industrial art*—including glass, pottery, metalwork, furniture and textiles, as well as machine design, such as railway locomotives, coaches, and so on; (3) the distribution of these products to the public, or *commercial art,* covering also advertising and the display of goods.

The author gives a short history of design in industry from the early nineteenth century to the present day, when industrial art has some chance of developing a distinctive character of its own, and architectural design is beginning to influence industrial design. This influence is best shown in the important mechanical services for buildings, such as elevators, and lighting, heating and ventilating systems.

As to the future of the designer, Mr. Gloag says "the architect is the only designer whose training is such that the manufacturer can be certain of getting the right sort of expert advice on design." He advises the young architect to study industrial production, to familiarize himself with industrial technique, to prepare for his place in the future.

BOOK OF THE SCHOOL 1874-1934. *By The Architectural Alumni Society, University of Pennsylvania. University of Pennsylvania Press, Philadelphia, Pa.* 213 *pages. Illustrated.*

As an offering of the Alumni Society to the former students of the Department of Architecture at the University of Pennsylvania, this handsomely illustrated book is a tribute to the diversified achievements of the contributors. Following a brief discussion of the policy and the history of the School of Architecture, and of the cultural influence of the study of architecture, there is a paper by Paul P. Cret on "Design." The plates of executed work include office buildings, residences, a chapel, a city hall, court houses, a church, libraries, schools, a post office, Department of Justice building, banks, college buildings, clubs, a hospital, custom house building. An alphabetical, chronological alumni record is appended.

WOOD STRUCTURAL DESIGN DATA. *Vol.* 1. *By R. G. Kimbell, A. T. Upson, M. Ahern. National Lumber Manufacturers Association,* 1337 *Connecticut Ave., Washington, D. C.* 294 *pages, Drawings* $1

This manual, spiral bound, is one of a series planned for a lumber library. It contains valuable information and tables for architects and engineers on the structural design and use, in a safe and economical manner, of certain types of wood members. The contents are primarily factual and provide mathematical data on such general subjects as: physical, chemical and mechanical properties of wood; timber quality strength relations; board measure; lumber quantity costs; sizes and properties of American standard yard lumber and timber; wood beams; wood columns; plank and laminated floors. Publications and information from the Forest Products Laboratory, Forest Service, U. S. Department of Agriculture, and Standard Works on Mechanics of Materials were used as sources of information.

LUMBER GRADE-USE GUIDE FOR SOFTWOOD AND HARDWOOD LUMBER IN BUILDING AND GENERAL CONSTRUCTION. *National Lumber Manufacturers Association,* 1337 *Connecticut Avenue, Washington, D. C. Fifteen loose-leaf pamphlets.* $1.50 *complete.*

The Guide is intended for determination of grades, species and sizes of lumber for framing, joists, subflooring, flooring, sheathing, interior trim, exterior wall covering, needed in any type of construction. Each of the fifteen pamphlets is devoted exclusively to the species of woods from a particular region or division of the industry, dealing in all with 22 individual kinds of softwoods, 33 hardwoods, and 26 different types of structures.

DESIGN & MEDIEVAL ARCHITECTURE. *By Helen Rosenau, Ph.D. B. T. Batsford, Ltd.,* 15 *North Audley Street, London, W. I.* 48 *pages. Illustrated.* 2*s.*6*d. net.*

CONTRIBUTIONS TO THE SECOND ANNUAL MINERAL INDUSTRIES CONFERENCE: HOME BUILDING IN ILLINOIS. *Published by The State of Illinois, Urbana, Ill.* 148 *pages. Illustrated.*

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THE

ARCHITECTURAL RECORD

VOLUME 77 NUMBER 4 APRIL, 1935

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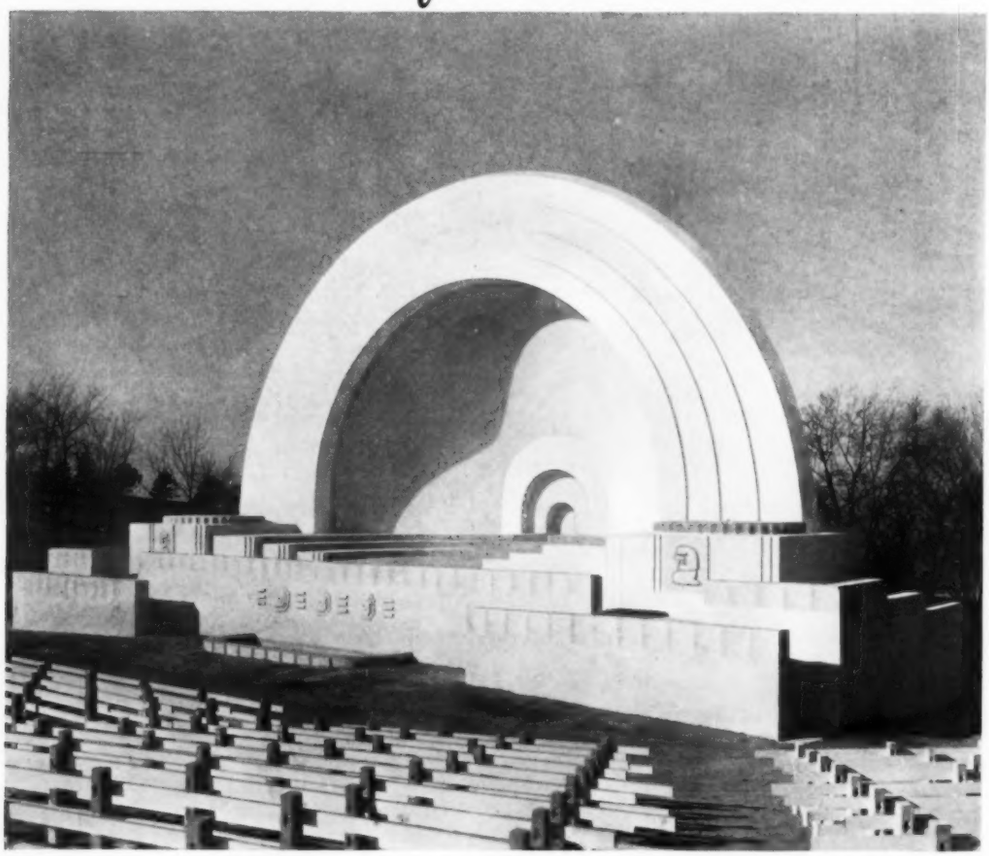

Winters are not mild in Sioux City—and it takes plenty of *hot* summer weather to grow Iowa's famous corn. So this music pavilion has to take plenty of weather. It *will* take it, and come up smiling, because it is built of concrete with a permanent, durable finish of Atlas White stucco.

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Planning the House Interior.

Design of Prisons.

THE
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A PRESENT-DAY OUTLOOK ON APPLIED ART

By CHARLES R. RICHARDS, Director, Museum of Science and Industry, New York

Architectural design in several countries in Europe has affected, or at least run parallel with, the design of commodities in the period since the World War to a greater extent than in the United States. Yet it is true today, as it has always been, that architectural design here as elsewhere must continue to exercise a guiding influence on applied design if we are to live in a harmonious physical world.

In late years the province of function in determining form has been greatly emphasized in architecture and in the design of household furnishings; and in the matter of surface treatment as well, both have gone far on the same road. If one walks north on Fifth Avenue from 59th Street it is easy to place chronologically the more important private houses erected between 1890 and 1926 by noting the lessening use of carved and molded ornament and increasing reliance on the beauty of plain stone surface for decorative effect.

Approach to the newer and more complex problem of the tall office building has followed a more varied and erratic course. Here legal requirements have, of course, played a large part, but the basic importance of function as the primary consideration in design has of necessity been increasingly recognized. In this field, however, treatment of the outside shell has varied from the banality of sheer bareness and stupid use of inappropriate ornament to splendid examples presenting fine dispositions of mass and outline with simple and subdued surface treatment. On the whole it is surely true that the tendency has been towards the suppression of meaningless ornament and reliance on the structural material for surface effects.

The contrast between such high peaks of architectural design as the Woolworth Building of more than 20 years ago and the Barclay-Vesey Building of the New York Telephone Company represents a change of attitude parallel with progress in the best of household design. In both cases economic considerations and aesthetic convictions have moved steadily forward in emphasizing the same general principles.

A LIVING ROOM
BY GILBERT ROHDE

Hedrich-Blessing

1

2

(1) Chair made in 1929 by Süe et Mare, leaders in modern design at the time of the Paris International Exposition of Modern Decorative and Industrial Art.

(2) The products of Eugene Schoen, in the author's judgment, combine the modern attitude toward applied design with the elegance stressed in this article.

In industrial design, however, meaning by that for the moment the design of useful commodities, practice has varied even more than in architecture. Here the two sets of ideas that divide the architects, viz., dependence upon tradition as the sole source of inspiration and the conviction that design should be thoroughly adapted to modern requirements and modern taste, have been and still are in strong conflict. In each camp one or the other of these ideas is held with such tenacity and intolerance of the other that real progress is severely handicapped.

On the one hand, paucity of imagination and limited vision on the part of manufacturers and designers together with the economic limitations of the professional decorator that operate in most cases to limit him to a mere purveyor of merchandise, serve to prevent the development of traditional forms into satisfying examples well fitted for the conditions of modern living.

On the other hand, among the protagonists of progress there has been in too many cases the failure to recognize the real significance of modernism as an emphasis and not a style. Pursued as a style, modernism becomes too often stark, eccentric, devoid of charm, alien to all tradition, and unassimilable with other expressions of design. Such a conception carries with it the illusion that a modern room must be composed entirely of objects distinctly and thoroughly modern in their quality of design, an illusion that M. Clouzot of the Musée Galliera in Paris has recently combatted. It is true that a room composed in a radical spirit hardly permits the company of old styles, but true modernism, or modernism with practical value, is by no means confined to radical conceptions.

If we conceive the real basis of the modern movement as an emphasis rather than a style, we are freed from dogmatism and intolerance. We no longer feel the need of condemning the old because it is old, but can bend our efforts solely to produce things thoroughly adapted for the requirements of modern life. If we look at our problem in this fashion

Hedrich-Blessing

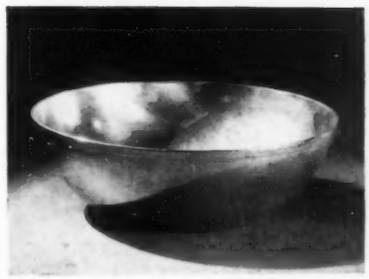
A LIVING ROOM
BY EUGENE SCHOEN

we see at once that there is much in traditional motives, as for instance in the simpler English and American furniture of the late eighteenth century, that is well fitted to serve as a basis for modern creations, both from the standpoint of utility and charm and from the ease with which they can be adapted to the requirements of quantity production.

There is at the same time plenty of opportunity for creations making use of new materials and new forms, but here the problem is more psychological than practical. Bathroom and kitchen equipment is built to meet functional requirements and represents a striking example of successful design in this respect, as truly modern as the motor car. Living rooms, dining rooms, and bedrooms bring forth other problems. Here we need something more than mere functional adjustments to bodily needs. We need to satisfy the human spirit with grace and charm and variety. We need also the familiar, and often the things dear to us by association.

It was remarked some years ago by the late M. Koechlin that the French designers, with all their notable achievements, had failed to produce a salon that rivalled those of the old styles. That statement pretty nearly holds true today, and applies equally to our own living rooms.

Modernism as conceived by its extreme exponents insisting upon purely functional considerations as the end and all of design, is likely to reduce our lares and penates to purely geometrical elements. It is true that simple, geometric forms are the easiest to produce, either with the hand tools of the craftsman or with the machines of today. They are the forms most readily made by the knife, the axe, the hand plane, the planing machine, and the turning lathe, but they are hardly the forms sufficing all the needs for companionship of the human spirit. They are simply the basis of usable forms that through all time man has labored to modify and enliven by added touches of interest and subtlety. Are these things to be barred from our lives because some misguided designers con-



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(1) Copper bowl by the Chase Brass & Copper Co.

(2) A high-fire vase by Leon Volkmar.

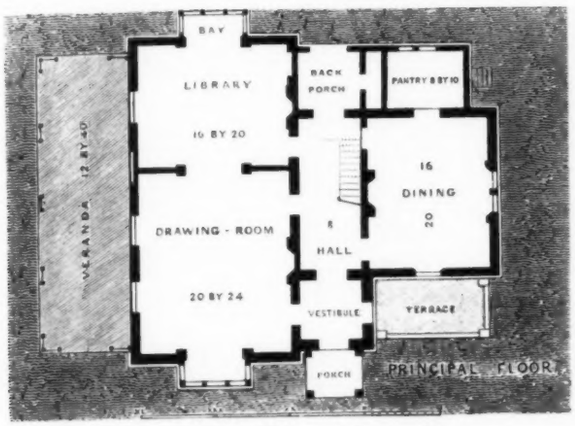
ceive their absence to be the only true expression of modernism? It is necessary only to ask this question to know the answer.

The radical attitude toward applied design is a natural and salutary reaction against the slavish dependence upon purely traditional forms that has marked all our creations well up to the last few years. This reaction has accomplished much, but it still has and will have its battles to fight until the slowly changing quality of public taste now evident has reached a much more general appreciation of the dignity and simplicity of straightforward design in household goods in contrast to mere decorative prettiness.

We have now reached a place, however, where it is desirable to consider both the achievements and weaknesses of the movement and to examine the situation with a view to greater unity and perhaps more intelligent effort in the future. Such an advance will inevitably come in time, as all the tendencies and evidences of modern life are continually rationalizing our point of view. To speed up this rapprochement we need to relinquish our extreme attitudes and bring the two opposing camps nearer together so that our best design talent will be brought nearer to a common working ground. One of the things most needed to permit this reconciliation would seem to be a recognition on the part of the leaders in the modern camp of the psychological element as one deserving as much attention and one in a sense as truly functional as the obvious physical considerations so often held to be all-sufficient.

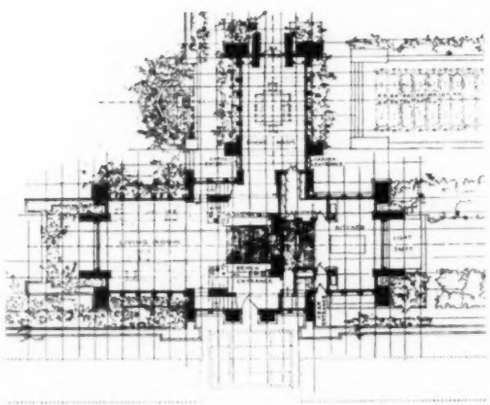
One cannot leave a discussion of modern design in the applied arts without care to distinguish between the design of useful objects of three dimensions and the treatment of wall and floor surfaces, furniture coverings, and hangings. What has been said in this article relates to the former class and has sought to emphasize the importance of functional considerations and reliance upon the structural material for decorative effects rather than upon applied painted or carved ornament. On the other hand is the important field of textiles in which imagination has free scope to run the gamut of color and line, and to balance the austere trend of modern furniture with fantasy and movement.

Low-priced furniture from the Chicago Workshops, Inc. The chair is reminiscent of the bentwood chairs first manufactured by Thonet Bros. in Vienna in 1853. These early chairs may be said to be the first modern chairs, as they departed entirely from traditional forms and technique, and were produced in a factory by mass production.

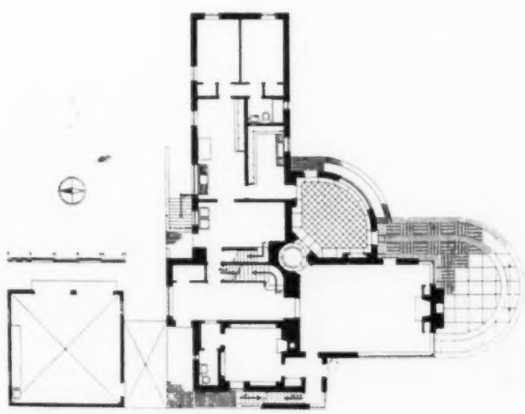


From COTTAGE RESIDENCES by A. J. Downing

1835 "A VILLA IN THE ITALIAN STYLE, BRACKETTED"



1900-10 HOUSE AT OAK PARK, ILLINOIS, BY FRANK LLOYD WRIGHT



1935 HOUSE AT AVON, CONNECTICUT, BY TALCOTT AND TALCOTT

Metropolitan Museum of Art

MID-VICTORIAN INTERIOR

INTERIOR ABOUT 1900

INTERIOR ABOUT 1920

CONTEMPORARY INTERIOR

INDUSTRIAL DESIGN AND THE ARCHITECT

By HARVEY WILEY CORBETT, Architect

In these days of specialization we are apt to think of industrial design as something very different from other forms of design, and therefore requiring a different approach, a different training, or a different technique. I think this is wrong: it indicates a misconception of the underlying principles of all design.

My readers may suppose that, speaking as an architect, I am endeavoring here to define abstractly the problems of a separate and distinct group, the industrial designers. This is not the case. I am an industrial designer myself. The objects of industry on which I expend my design efforts are office buildings instead of egg-beaters, but I fail to see wherein my background of training and experience does not equip me more effectively to design egg-beaters than the background of the egg-beater specialist qualifies him to design office buildings. Design is something generic and all-inclusive, not something special and limited to a fixed field.

Perhaps at this point a definition or two may be clarifying. Words are all too loosely used these days. "Art," as one of these words, can mean anything or nothing at all, according to one's point of view.

"Design" is another such word, possibly not with so wide a variety of interpretations but still surprisingly indefinite. In its application to this discussion we define "design" as being an effort to improve appearance, and in saying that I do not necessarily mean making an object more beautiful.

"Beauty" is another painfully indefinite word; all too often one man's notion of beauty is another man's horror. For centuries man has been trying to define beauty and to fix its limitations. He has not yet succeeded, and I doubt if he ever will. The most vital element in all art is the ever-changing standard of beauty.

We might, however, attempt to define the present purpose of design—whether it be a cathedral or a teacup. If the object is intended to last a long time, then the designer must be so guided and make sure that it will have an attractive appearance not only today but throughout the years. If, on the other hand, the object is only of fleeting duration, then it must be designed with reference to prevailing ideas of appearance, which the designer knows may not be lasting but will have immediate public appeal.

Fortunately at present a new and rational point of view has come into general acceptance. Practical use and function dominate the designer's work, and the bad logic of the past thirty or forty years—the thinking that "design" is something "added to," "stuck on," or "painted over" the practical functional form has been largely abandoned.

The great volume of industrial mass-produced articles coming on the American scene in recent years has developed peculiar and striking problems in design. The machine-made commodity has been not only cheaper, but functionally better than the hand-made commodity. It has not been necessarily attractive in appearance. Its appeal has been economic and practical rather than aesthetic, and little thought has been given to appearance until two or more manufacturers begin producing the same article, each practical and efficient, each about the same in cost. The manufacturer discovers that the purchaser is obliged to exercise a choice, not a choice based on practicability or on price, but on something else, and that something else is called "appearance."

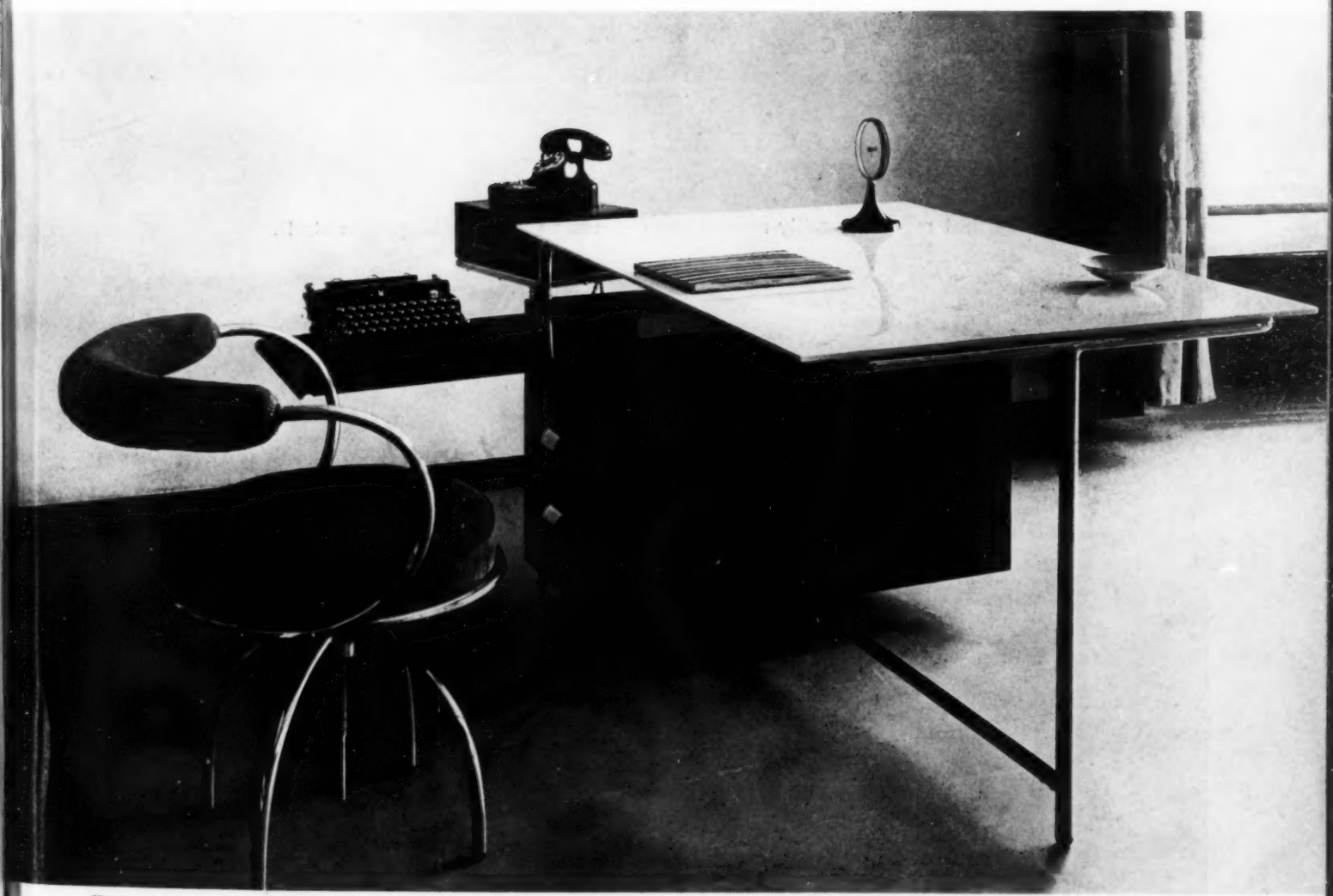
Competitive merchandising forces manufacturers to give serious attention to design. This is the underlying reason why, in the field of industrial production, design has taken an ever increasingly important position.

Design follows many directions. It may aim simply to secure a shocking or arresting effect, or to create something inherently and lastingly beautiful; between these two extremes, we have a long scale of variations.

Fortunately there are several equally practical ways of accomplishing a given functional result. The trained designer must know these ways. He must understand his problem intimately; he must know his materials, his processes of manufacture; the economies effected through understanding of these processes. With this background of knowledge he can then make his choice. If he seeks a bizarre appearance, something strange, exotic, unusual, he makes one choice. If he seeks to secure an effect of stability, permanence and enduring value, he makes another choice. This procedure applies with equal force to architectural design as well as to design of the smallest and most inconsequential products.

Architects in the past few years have not been overburdened with work. Many of them have wondered if there is not some new field in which they can make use of their background of training and experience, and their talents in design. Just recently a leader in the merchandising field—a man who understands and appreciates the value of design in every product of industry—informed me that he prefers, whenever possible, to get designers who have had architectural training. He feels that they have the most rational approach to the design problem.

OFFICE FURNITURE. **Maximum convenience and minimum means.** **Heinrich Lauterbach, architect.**

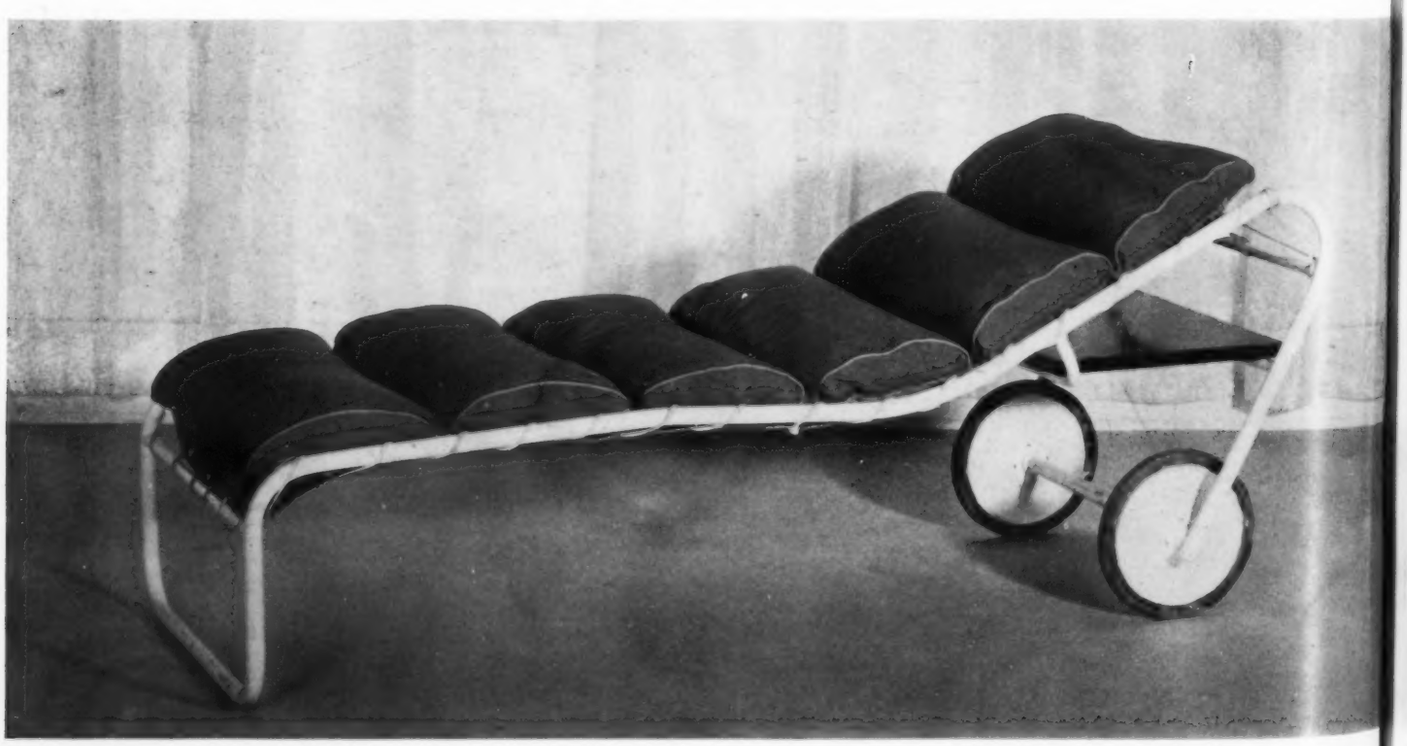


Klettephoto

Photograph by G. Thirier

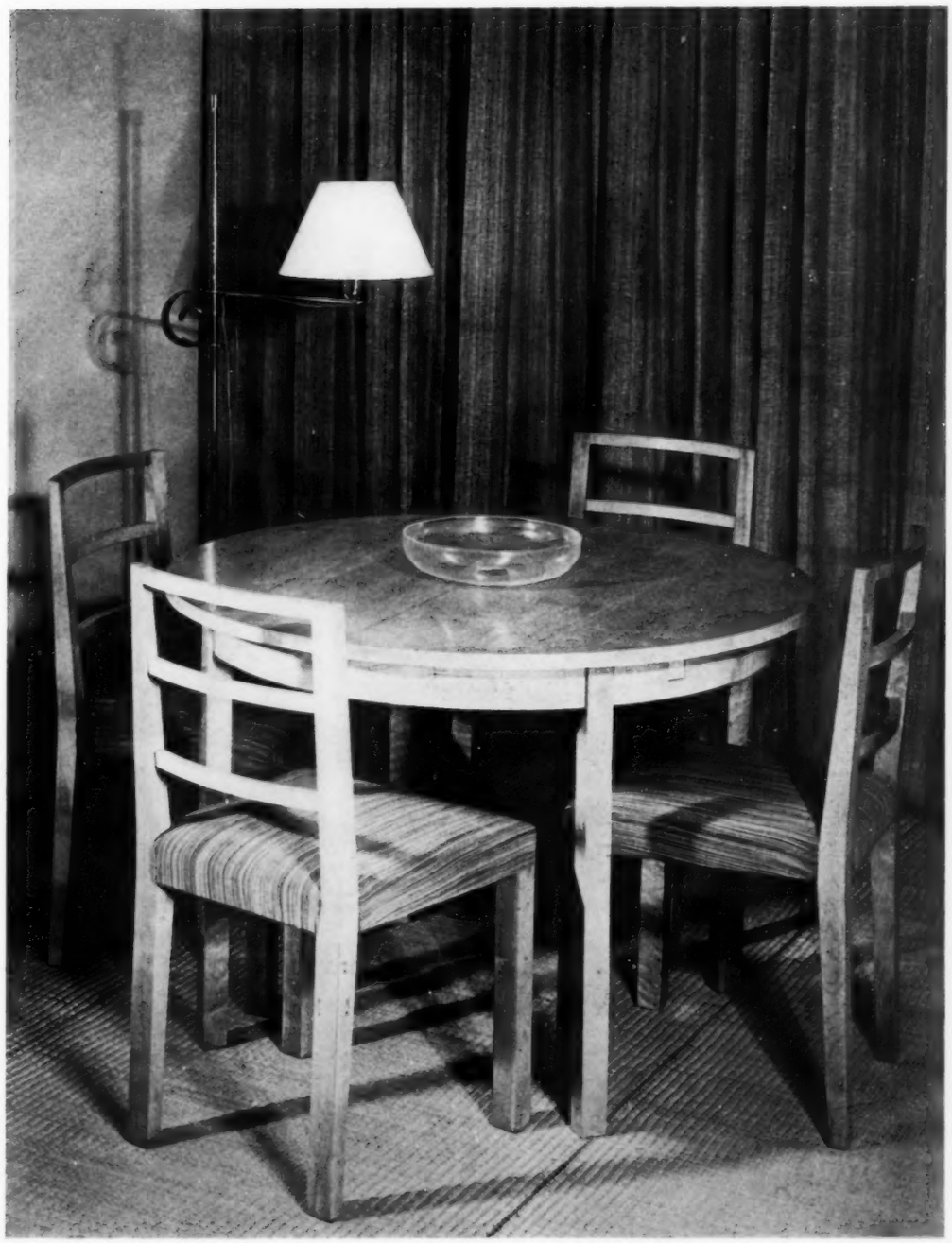
CHAIR with welded frame. Arm-rests of fabric. Cushioned seat and back. Designed by Le Corbusier, P. Jeanneret and Charlotte Perriand, architects.

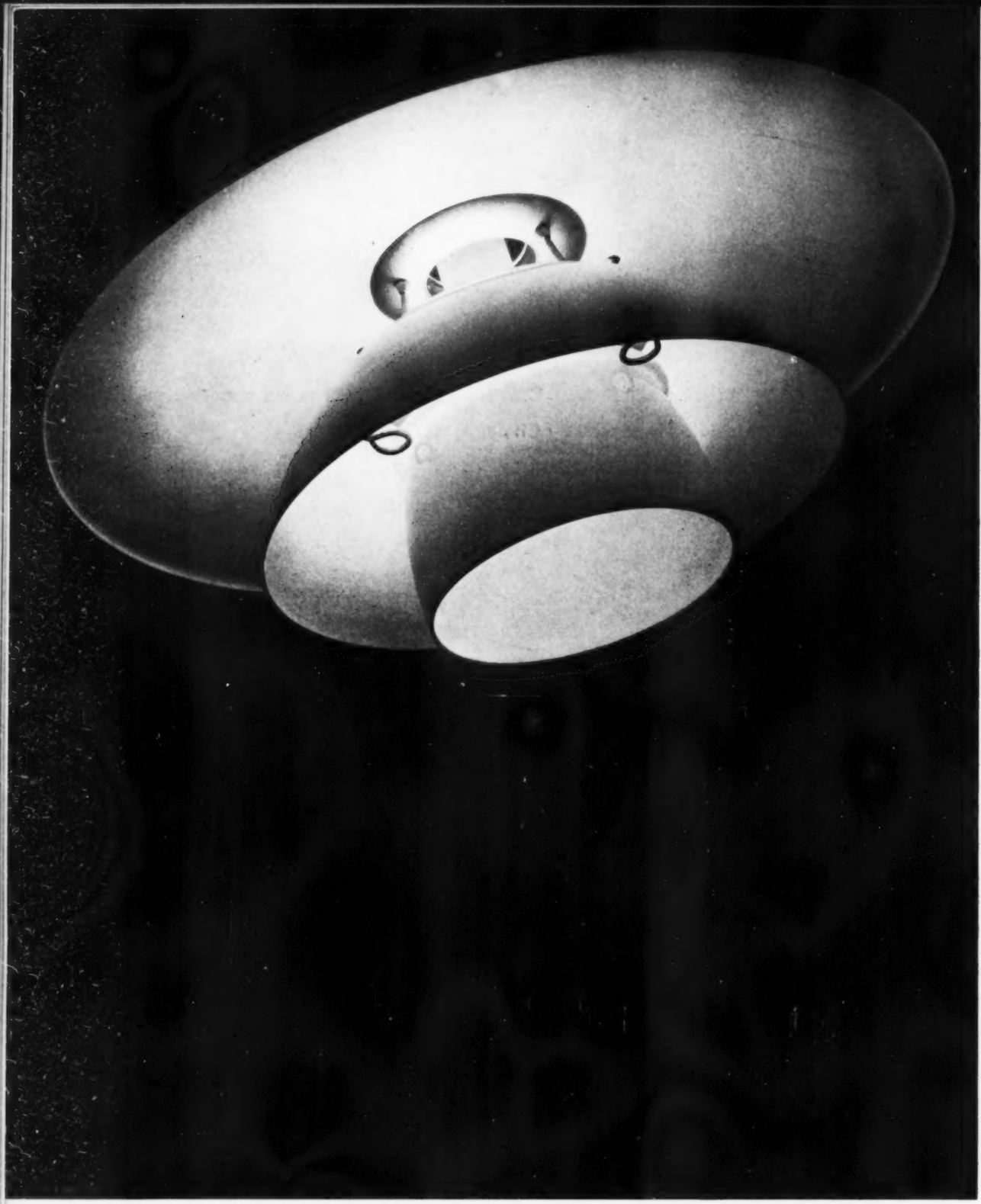
RECLINING COUCH that may be readily moved from place to place. Magazine shelf.



Photograph by Iversen Studio for Metallon Corp

LOW-COST DINING TABLE AND CHAIRS of wood with seats upholstered in horsehair material. Designed by Chicago Workshops, Inc.

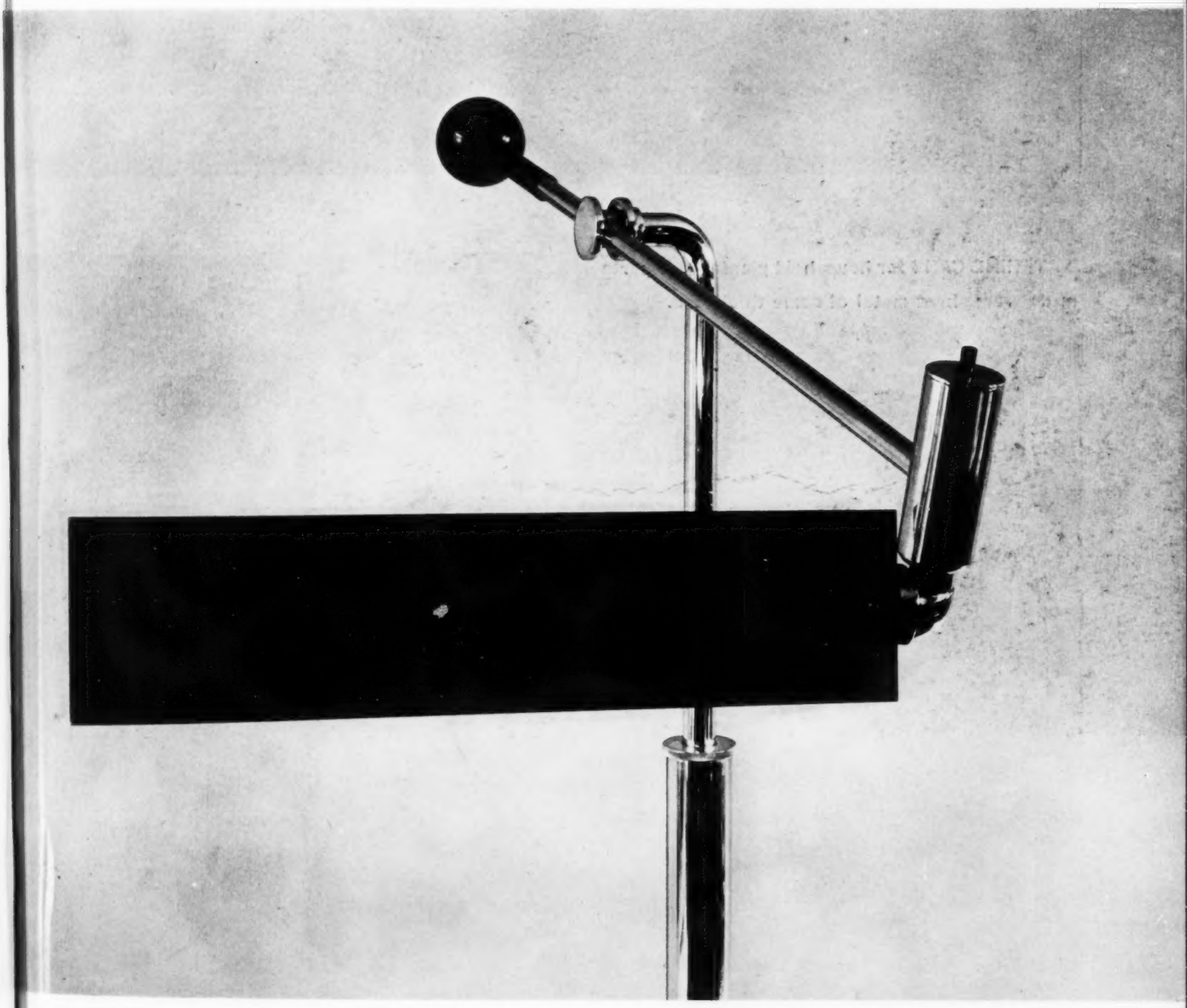


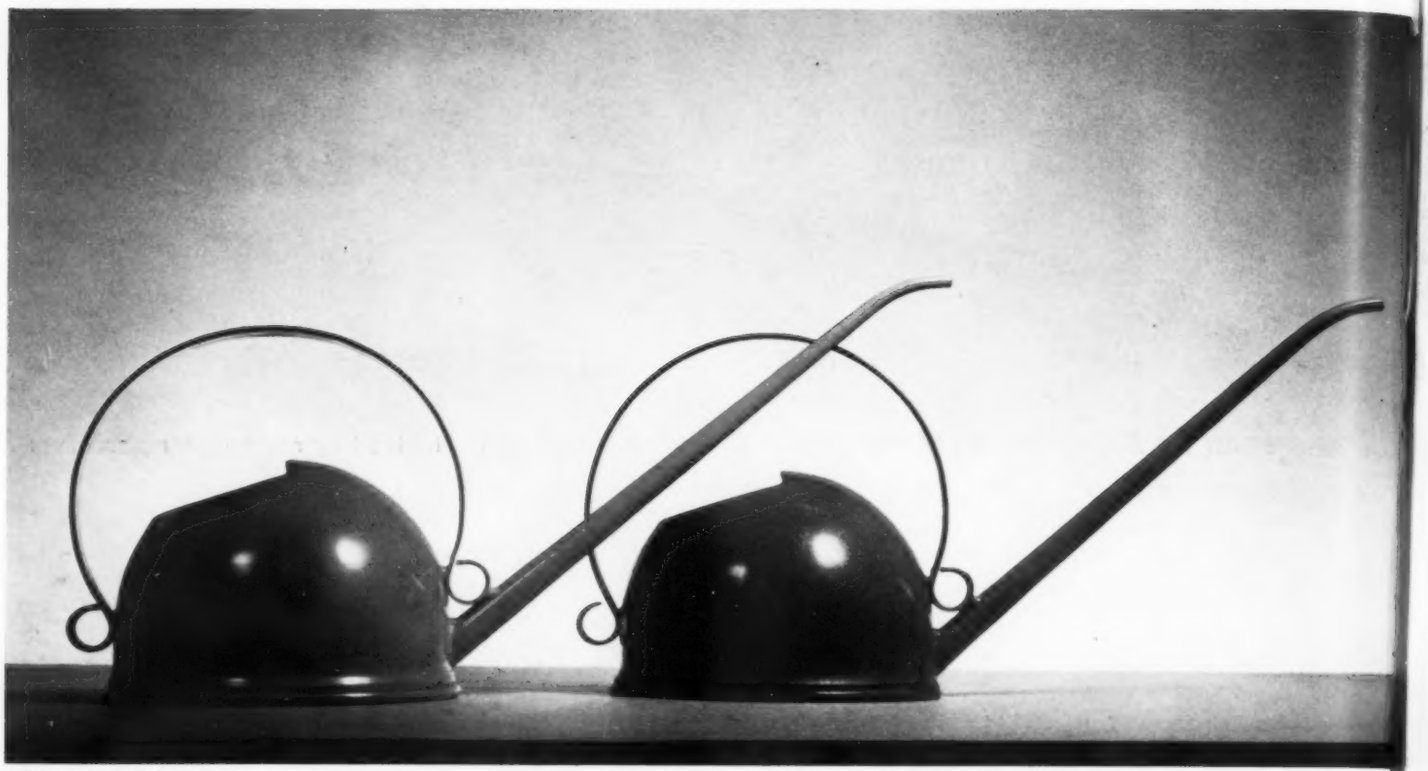


Photograph by F. S. Lincoln

P-H LIGHTING REFLECTOR. The glass reflectors are designed to conceal lighting bulb and to provide efficient glareless distribution of light.

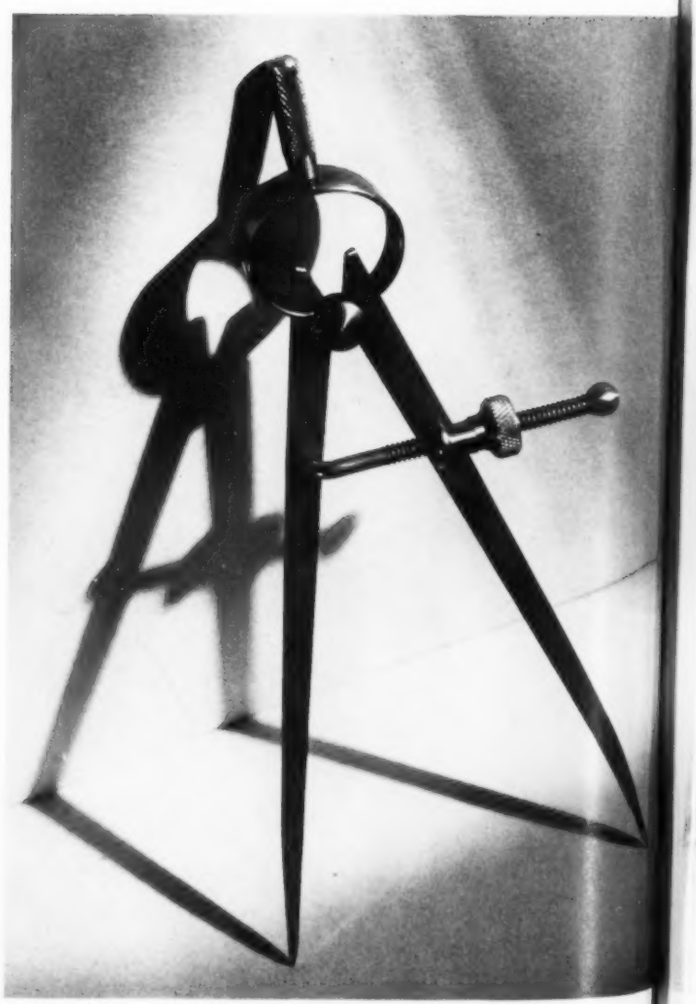
HEAD OF ADJUSTABLE FLOOR LAMP. Tubular mazda bulb is shielded by rectangular chromium sheet. Designed by Frederick Kiesler, architect.





Photographs by F. S. Lincoln

WATERING CANS for household plants. All parts made from sheet metal of same thickness.



DIVIDERS. This instrument of precision demonstrates a mathematical basis of good proportion.

EGG SLICER. A factory-made product without any formal intention. The shape was conditioned by purpose and by natural process of manufacture.

Photographs by Ruth Bernhard for Museum of Modern Art

GRADUATED MEASURES of non-oxydizing metal.

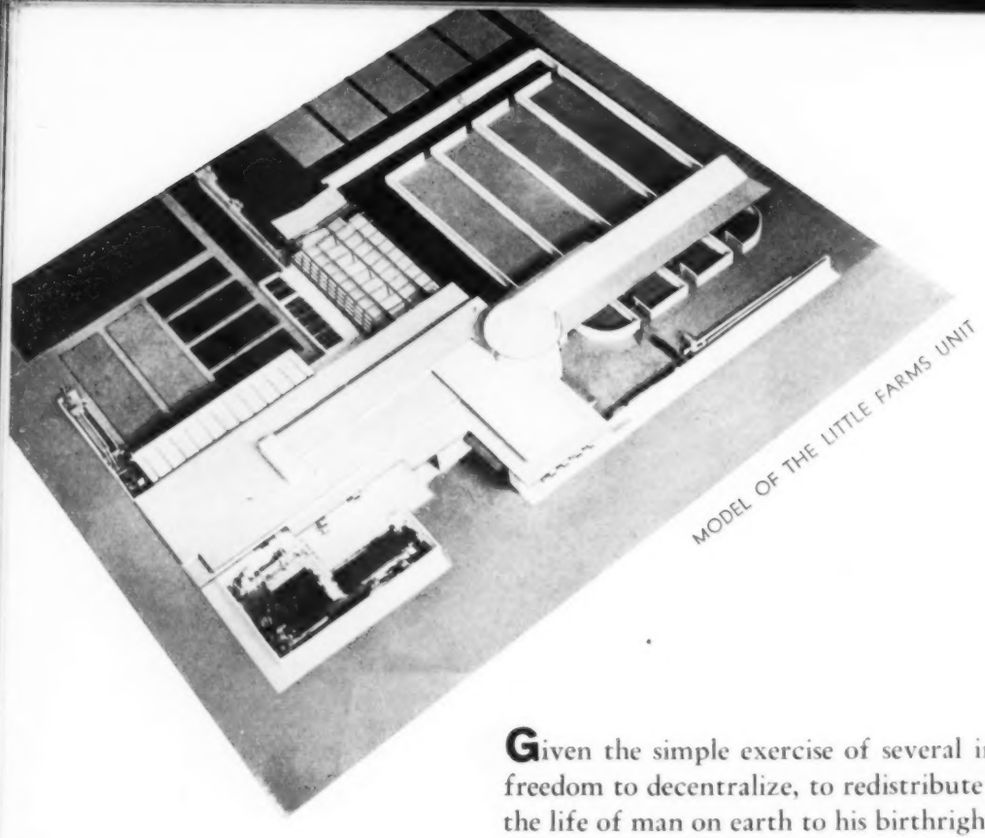
MEERSCHAUM PIPE by Dunhill. Only slight variations are possible in the proportions of a pipe.

PENCIL AND CIGARETTE LIGHTER of sterling silver.

FRANK LLOYD WRIGHT
ARCHITECT

BROADACRE CITY: A NEW COMMUNITY PLAN

● In this article Frank Lloyd Wright describes his conception of Broadacres as the ideal community—"a general decentralization and architectural reintegration of all units into one fabric." A model illustrating the coordinated grouping of small farms, small factories, small homes, small schools, and small laboratories has been prepared by Mr. Wright and his student-apprentices of the Taliesin Fellowship (Taliesin, Wisconsin) in a winter session at Chandler, Arizona. It will be shown publicly for the first time April 15 to May 15 at the Industrial Arts Exposition in Rockefeller Center, New York City, under the auspices of the National Alliance of Art and Industry.



MODEL OF THE LITTLE FARMS UNIT

Given the simple exercise of several inherently just rights of man, the freedom to decentralize, to redistribute and to correlate the properties of the life of man on earth to his birthright—the ground itself—and Broadacre City becomes reality.

As I see Architecture, the best architect is he who will devise forms nearest organic as features of human growth by way of changes natural to that growth. Civilization is itself inevitably a form but not, if democracy is sanity, is it necessarily the fixation called "academic." All regimentation is a form of death which may sometimes serve life but more often imposes upon it. In Broadacres all is symmetrical but it is seldom obviously and never academically so.

Whatever forms issue are capable of normal growth without destruction of such pattern as they may have. Nor is there much obvious repetition in the new city. Where regiment and row serve the general harmony of arrangement both are present, but generally both are absent except where planting and cultivation are naturally a process or walls afford a desired seclusion. Rhythm is the substitute for such repetitions everywhere. Wherever repetition (standardization) enters, it has been modified by inner rhythms either by art or by nature as it must, to be of any lasting human value.

The three major inventions already at work building Broadacres, whether the powers that over-built the old cities otherwise like it or not are:

(1) The motor car: general mobilization of the human being.

(2) Radio, telephone and telegraph: electrical intercommunication becoming complete.

(3) Standardized machine-shop production: machine invention plus scientific discovery.

The price of the major three to America has been the exploitation we see everywhere around us in waste and in ugly scaffolding that may now be thrown away. The price has not been so great if by way of popular government we are able to exercise the use of three inherent rights of any man:

(1) His social right to a direct medium of exchange in place of gold as a commodity: some form of social credit.

(2) His social right to his place on the ground as he has had it in the sun and air: land to be held only by use and improvements.

(3) His social right to the ideas by which and for which he lives: public ownership of invention and scientific discoveries that concern the life of the people.

The only assumption made by Broadacres as ideal is that these three rights will be the citizen's so soon as the folly of endeavoring to cheat him of their democratic values becomes apparent to those who hold (feudal survivors or survivals), as it is becoming apparent to the thinking people who are held blindly abject or subject against their will.

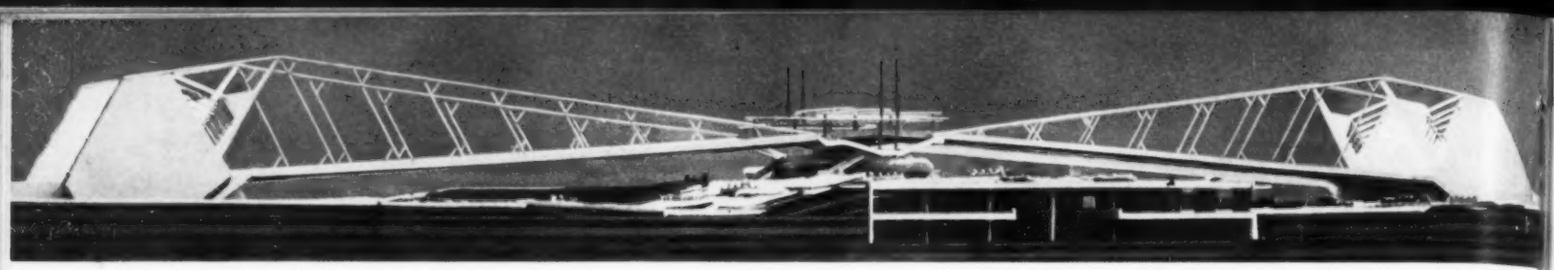
The landlord is no happier than the tenant. The speculator can no longer win much at a game about played out. The present success-ideal placing, as it does, premiums upon the wolf, the fox and the rat in human affairs and above all, upon the parasite, is growing more evident every day as a falsity just as injurious to the "successful" as to the victims of such success.

Well—sociologically, Broadacres is release from all that fatal "success" which is after all, only excess. So I have called it a new freedom for living in America. It has thrown the scaffolding aside. It sets up a new ideal of success.

FRANK LLOYD WRIGHT AND TWO OF HIS STUDENT-APPRENTICES

In Broadacres, by elimination of cities and towns the present curse of petty and minor officialdom, government, has been reduced to one minor government for each county. The waste motion, the back and forth haul, that today makes so much idle business is gone. Distribution becomes automatic and direct; taking place mostly in the region of origin. Methods of distribution of everything are simple and direct. From the maker to the consumer by the most direct route.

Coal (one third the tonnage of the haul of our railways) is eliminated by burning it at the mines and transferring that power, making it easier to take over the great railroad rights of way; to take off the cumbersome



Photographs by Dan Keller

BRIDGE PASS OVER THE GREAT ARTERIAL RIGHT OF WAY WHICH CONSISTS OF MANY LANES OF SPEED TRAFFIC ABOVE. MONORAIL SPEED TRAINS IN THE MIDDLE, AND TRUCK TRAFFIC ON LOWER SIDE LANES. WITHIN THE HIGHWAY STRUCTURE ARE STORAGE FACILITIES FOR RAW MATERIALS.

rolling stock and put the right of way into general service as the great arterial on which truck traffic is concentrated on lower side lanes, many lanes of speed traffic above and monorail speed trains at the center, continuously running. Because traffic may take off or take on at any given point, these arterials are traffic not dated but fluescent. And the great arterial as well as all the highways become great architecture, automatically affording within their structure all necessary storage facilities of raw materials, the elimination of all unsightly piles of raw material.

In the hands of the state, but by way of the county, is all redistribution of land—a minimum of one acre going to the childless family and more to the larger family as effected by the state. The agent of the state in all matters of land allotment or improvement, or in matters affecting the harmony of the whole, is the architect. All building is subject to his sense of the whole as organic architecture. Here architecture is landscape and landscape takes on the character of architecture by way of the simple process of cultivation.

All public utilities are concentrated in the hands of the state and county government as are matters of administration, patrol, fire, post, banking, license and record, making politics a vital matter to every one in the new city instead of the old case where hopeless indifference makes "politics" a grafter's profession.

In the buildings for Broadacres no distinction exists between much and little, more and less. Quality is in all, for all, alike. The thought entering into the first or last estate is of the best. What differs is only individuality and extent. There is nothing poor or mean in Broadacres.

Nor does Broadacres issue any dictum or see any finality in the matter either of pattern or style.

Organic character is style. Such style has myriad forms inherently good. Growth is possible to Broadacres as a fundamental form: not as mere accident of change but as integral pattern unfolding from within.

Here now may be seen the elemental units of our social structure: The correlated farm, the factory—its smoke and gases eliminated by burning coal at places of origin, the decentralized school, the various conditions of residence, the home offices, safe traffic, simplified govern-

ment. All common interests take place in a simple coordination wherein all are employed: *little* farms, *little* homes for industry, *little* factories, *little* schools, a *little* university going to the people mostly by way of their interest in the ground, *little* laboratories on their own ground for professional men. And the farm itself, notwithstanding its animals, becomes the most attractive unit of the city. The husbandry of animals at last is in decent association with them and with all else as well. True farm relief.

To build Broadacres as conceived would automatically end unemployment and all its evils forever. There would never be labor enough nor could under-consumption ever ensue. Whatever a man did would be done—obviously and directly—mostly by himself in his own interest under the most valuable inspiration and direction: under training, certainly, if necessary. Economic independence would be near, a subsistence certain; life varied and interesting.

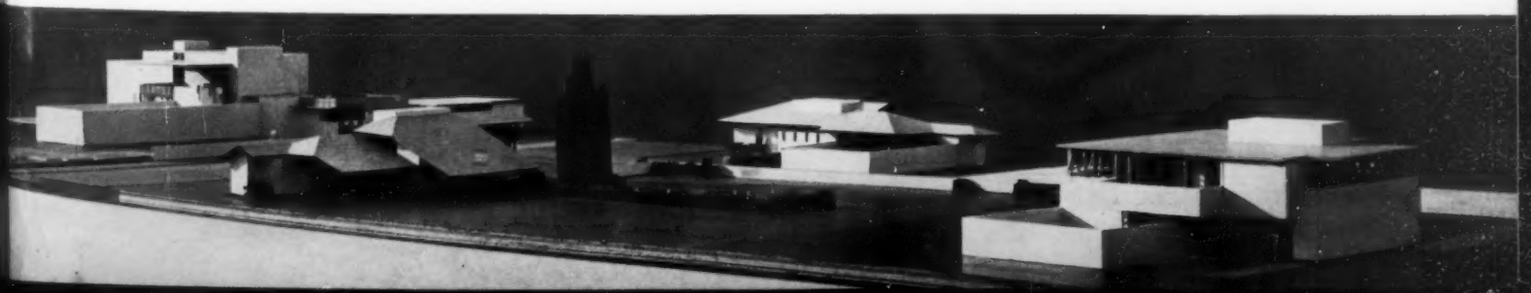
Every kind of builder would be likely to have a jealous eye to the harmony of the whole within broad limits fixed by the county architect, an architect chosen by the county itself. Each county would thus naturally develop an individuality of its own. Architecture—in the broad sense—would thrive.

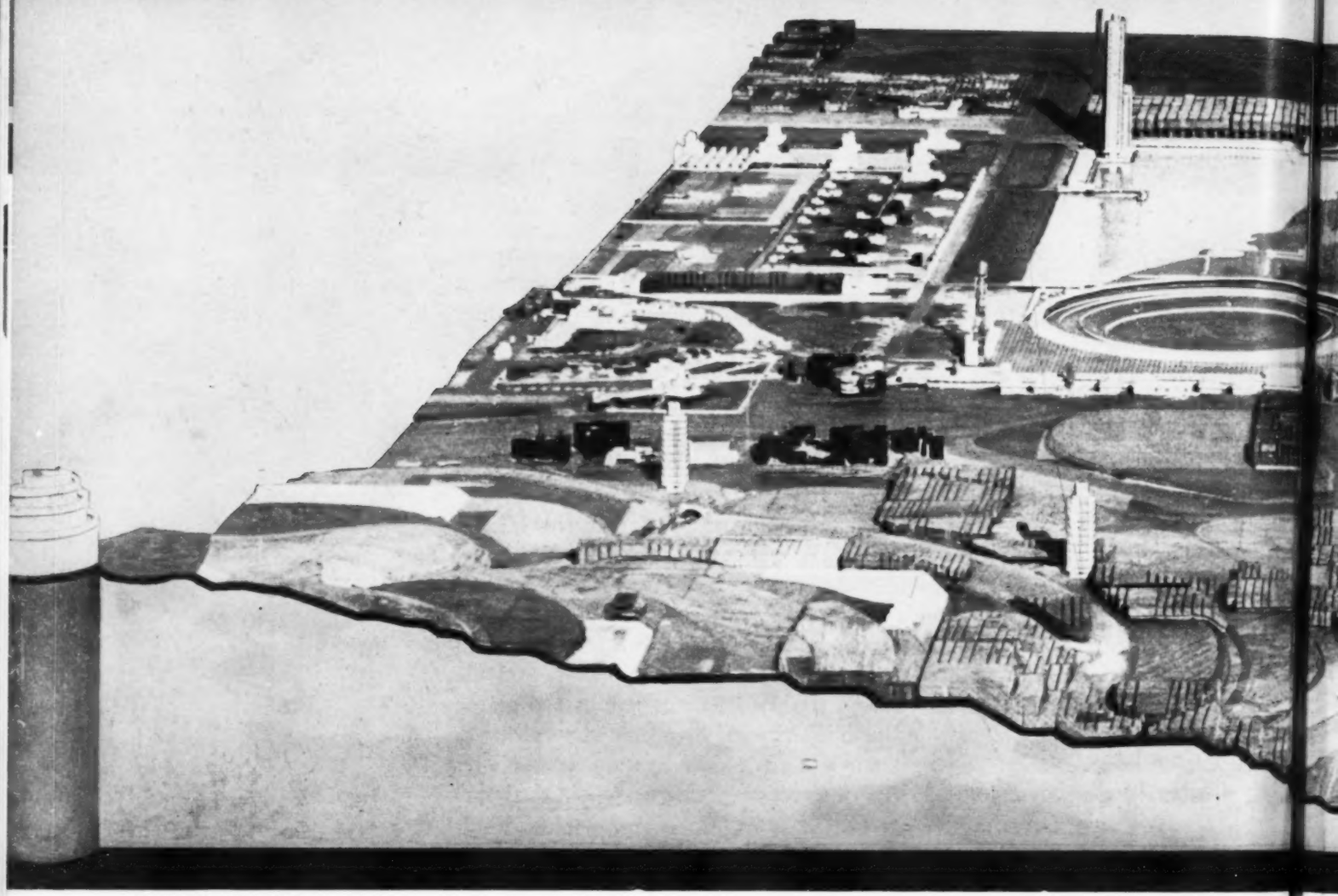
In an organic architecture the ground itself predetermines all features; the climate modifies them; available means limit them; function shapes them.

Form and function are one in Broadacres. But Broadacres is no finality. The model shows four square miles of a typical countryside developed on the acre as unit according to conditions in the temperate zone and accommodating some 1,400 families. It would swing north or swing south in type as conditions, climate and topography of the region changed.

In the model the emphasis has been placed upon diversity in unity, recognizing the necessity of cultivation as a need for formality in most of the planting. By a simple government subsidy certain specific acres or groups of acre units are, in every generation, planted to useful trees,

COLLATERAL DETAIL MODELS: A TWO-CAR HOUSE, TWO MINIMUM HOUSES AND A MEDIUM HOUSE.





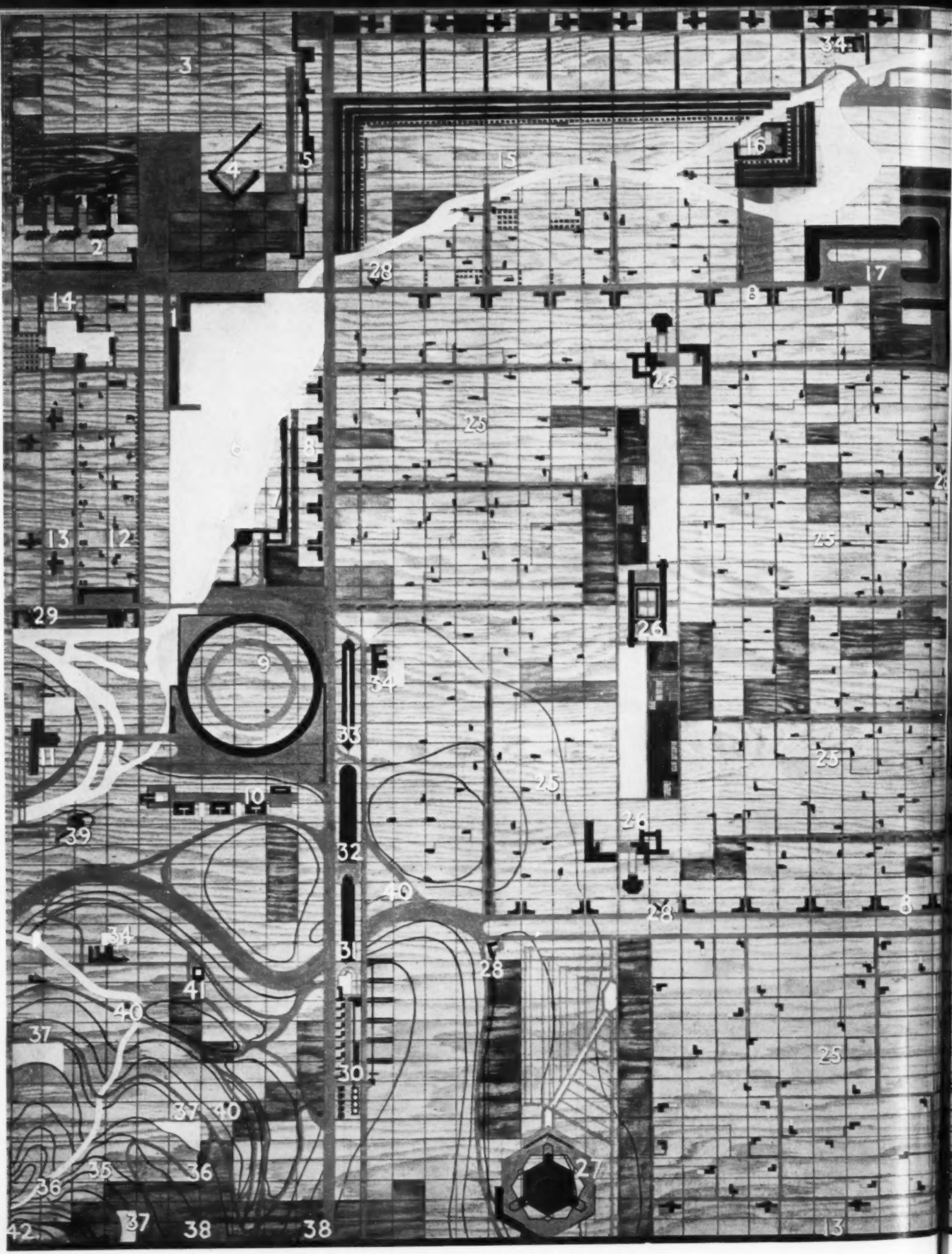
Photographs by Dan Keller

THE MODEL SHOWS FOUR SQUARE MILES OF A TYPICAL COUNTRYSIDE DEVELOPED ON THE ACRE AS UNIT ACCORDING TO CONDITIONS IN THE TEMPERATE ZONE AND ACCOMMODATING SOME 1,400 FAMILIES. IT WOULD SWING NORTH OR SWING SOUTH IN TYPE AS CONDITIONS, CLIMATE AND TOPOGRAPHY OF THE REGION CHANGED

meantime beautiful, giving privacy and various rural divisions. There are no rows of trees alongside the roads to shut out the view. Rows where they occur are perpendicular to the road or the trees are planted in groups. Useful trees like white pine, walnut, birch, beech, fir, would come to maturity as well as fruit and nut trees and they would come as a profitable crop meantime giving character, privacy and comfort to the whole city. The general park is a flowered meadow beside the stream and is bordered with ranks of trees, tiers gradually rising in height above the flowers at the ground level. A music-garden is sequestered from noise at one end. Much is made of general sports and festivals by way of the stadium, zoo, aquarium, arboretum and the arts.

The traffic problem has been given special attention, as the more mobilization is made a comfort and a facility the sooner will Broadacres arrive. Every Broadacre citizen has his own car. Multiple-lane highways make travel safe and enjoyable. There are no grade crossings nor left turns on grade. The road system and construction is such that no signals nor any lamp-posts need be seen. No ditches are alongside the roads. No curbs either. An inlaid purfling over which the car cannot come without damage to itself takes its place to protect the pedestrian.

In the affair of air transport Broadacres rejects the present airplane and



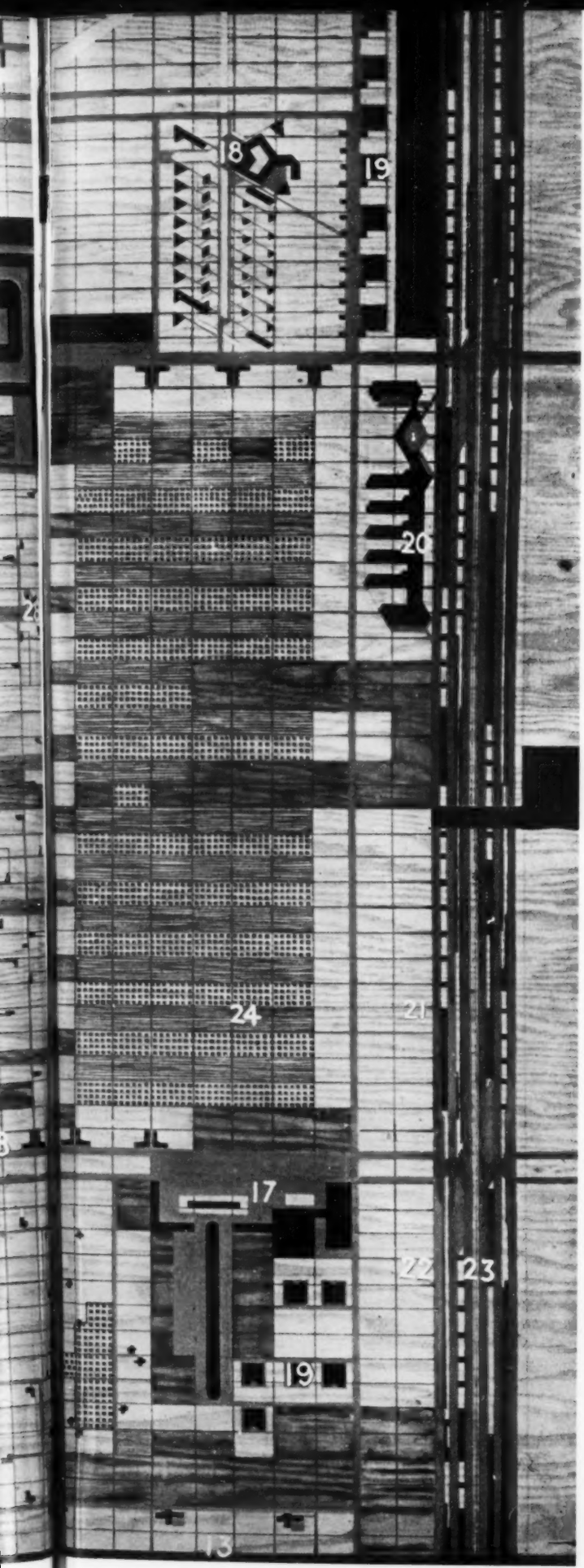


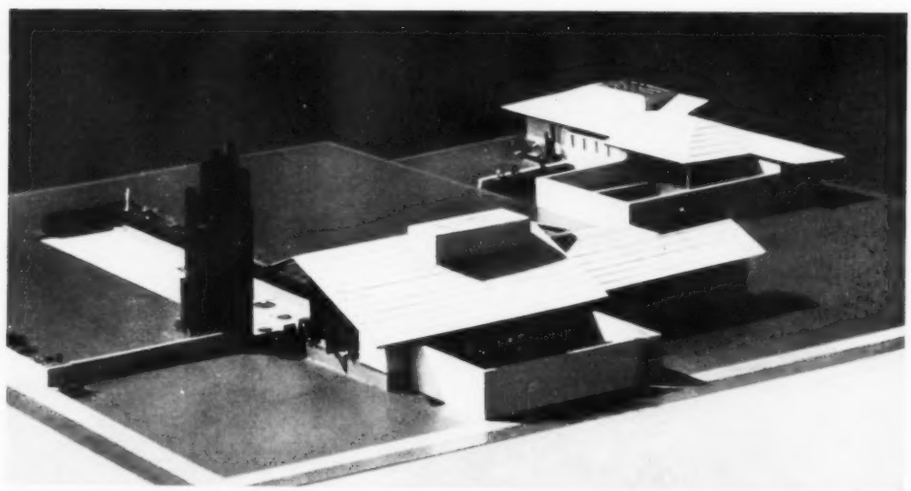
CHART TO PLAN OF BROADACRES

(1) County Seat—Administration. (2) Aerotor—Post Port and Administration. (3) Polo. (4) Baseball. (5) Clubs. (6) Lake and Stream. (7) Crafts and County Architects. (8) Professionals. (9) Stadium. (10) Hotel. (11) Sanitarium. (12) Small Industry. (13) Small Farm Units. (14) Small Apartments. (15) Interior Park. (16) Music Garden. (17) Merchandising. (18) Automobile Inn. (19) Little Factories with Dwellings Above. (20) Factory Assembly. (21) Aerotor Service. (22) Aerotor Factory. (23) Main Arterial (the Present Railway). (24) Vineyards and Orchards. (25) Homes. (26) Schools. (27) Temple—Columbarium and Cemetery. (28) Neighborhood Guests Houses. (29) Baths and Dressing Rooms. (30) Scientific and Agricultural Research. (31) Arboretum. (32) Zoo. (33) Aquarium. (34) Luxurious Dwelling (House on the Mesa). (35) Taliesin (Equivalent). (36) Luxurious Homes. (37) Water Supply. (38) Forest Cabins. (39) Country Club. (40) Apartment Houses. (41) Small School for Small Children. (42) Automobile Objective.

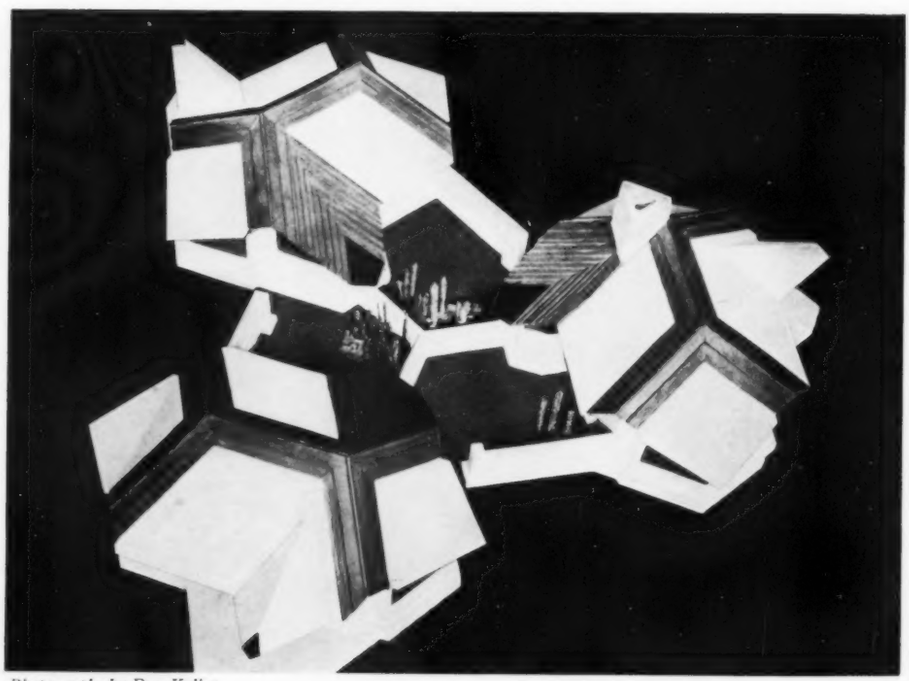
NOTE

Plot—two miles square. Unit of division—one acre: 1,648 by 264 feet. Transportation and garage system—semi-dark bands. Left turns, crossings and overpasses (see detail photographs). Reforestation: dark acreage.

AN APPRENTICE GROUP AT WORK



COLLATERAL MODEL OF TWO MINIMUM HOUSES



A GROUP OF BLACK AND CANVAS CABINS IN THE AUTOMOBILE INN

Photographs by Dan Keller

substitutes the self-contained mechanical unit that is sure to come: an aerotor capable of rising straight up and by reversible rotors able to travel in any given direction under radio control at a maximum speed of, say, 200 miles an hour, and able to descend safely into the hexacomb from which it arose or anywhere else. By a doorstep if desired.

The only fixed transport trains kept on the arterial are the long-distance monorail cars traveling at a speed (already established in Germany) of 220 miles per hour. All other traffic is by motor car on the twelve lane levels or the triple truck lanes on the lower levels which have on both sides the advantage of delivery direct to warehousing or from warehouses to consumer. Local trucks may get to warehouse-storage on lower levels under the main arterial itself. A local truck road parallels the swifter lanes.

Houses in the new city are varied: make much of fireproof synthetic materials, factory-fabricated units adapted to free assembly and varied arrangement, but do not neglect the older nature-materials wherever they are desired and available. Householders' utilities are nearly all planned in prefabricated utility stacks or units, simplifying construction and reducing building costs to a certainty. There is the professional's house with its laboratory, the minimum house with its workshop, the medium house ditto, the larger house and the house of machine-age-luxury. We might speak of them as a one-car house, a two-car house, a three-car house and a five-car house. Glass is extensively used as are roofless rooms. The roof is used often as a trellis or a garden. But where glass is extensively used it is usually for domestic purposes in the shadow of protecting overhangs.

Copper for roofs is indicated generally on the model as a permanent cover capable of being worked in many appropriate ways and giving a general harmonious color effect to the whole.

Electricity, oil and gas are the only popular fuels. Each land allotment has a pit near the public lighting fixture where access to the three and to water and sewer may be had without tearing up the pavements.

The school problem is solved by segregating a group of low buildings

in the interior spaces of the city where the children can go without crossing traffic. The school building group includes galleries for loan collections from the museum, a concert and lecture hall, small gardens for the children in small groups and well-lighted cubicles for individual outdoor study: there is a small zoo, large pools and green playgrounds.

This group is at the very center of the model and contains at its center the higher school adapted to the segregation of the students into small groups.

This tract of four miles square, by way of such liberal general allotment determined by acreage and type of ground, including apartment buildings and hotel facilities, provides for about 1,400 families at, say, an average of five or more persons to the family.

To reiterate: the basis of the whole is general decentralization as an applied principle and architectural reintegration of all units into one fabric; free use of the ground held only by use and improvements; public utilities and government itself owned by the people of Broadacre City; privacy on one's own ground for all and a fair means of subsistence for all by way of their own work on their own ground or in their own laboratory or in common offices serving the life of the whole.

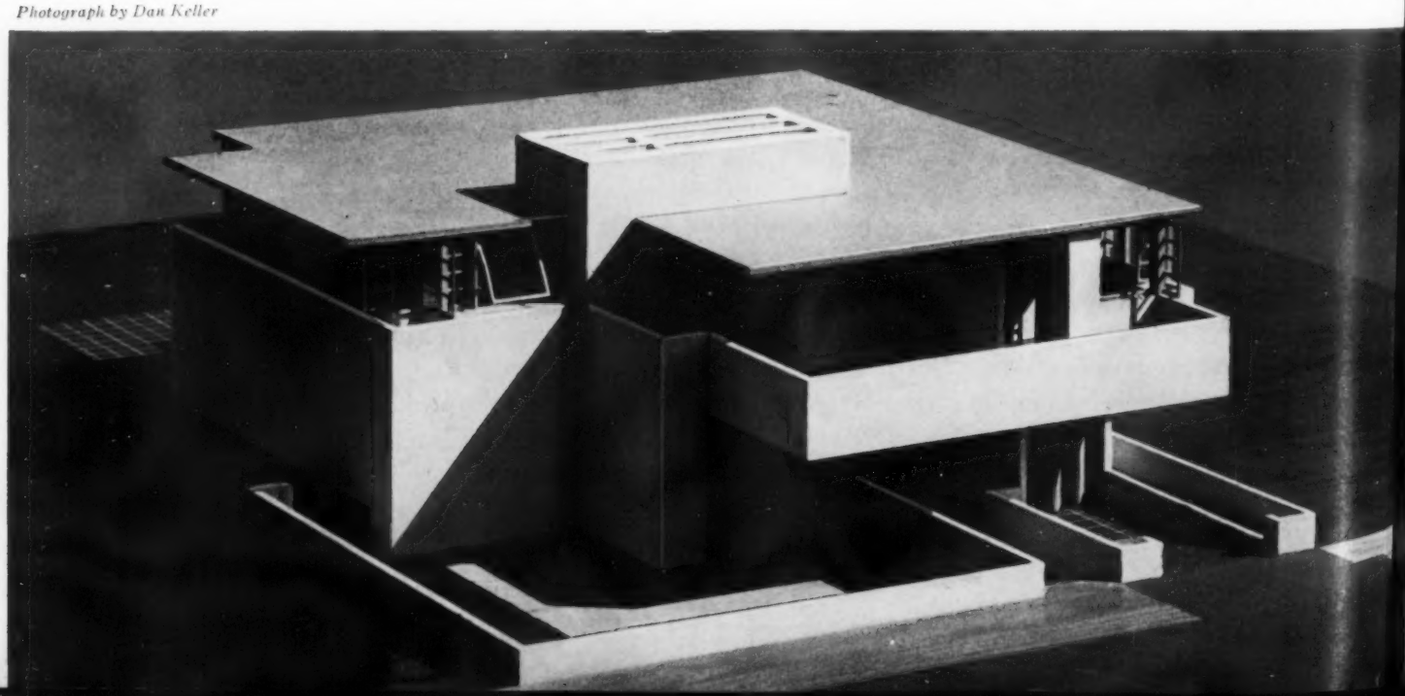
There are too many details involved in the model of Broadacres to permit complete explanation. Study of the model itself is necessary study. Most details are explained by way of collateral models of the various types of construction shown: highway construction, left turns, crossovers, underpasses and various houses and public buildings.

Any one studying the model should bear in mind the thesis upon which the design has been built by the Taliesin Fellowship, built carefully not as a finality in any sense but as an interpretation of the changes inevitable to our growth as a people and a nation.

Individuality established on such terms must thrive. Unwholesome life would get no encouragement and the ghastly heritage left by overcrowding in overdone ultra-capitalistic centers would be likely to disappear in three or four generations. The old success ideals having no chance at all, new ones more natural to the best in man would be given a fresh opportunity to develop naturally.

MODEL OF THE 2-CAR HOUSE

Photograph by Dan Keller



DRAFTSMANSHIP IS NOT ARCHITECTURE

By W. R. B. WILLCOX, Architect

Competent draftsmanship is essential to one entering the profession of architecture. If more need be said, the aspirant should, by persistent and patient practice, acquire a serviceable technique with charcoal, pen, pencil and brush—both water colors and oils, if possible—and gain some experience in modeling with clay and plasticene. Whatever proficiency he can develop will aid him, while a draftsman, to get and hold a job, and as draftsman and architect, in his study of design, in communicating ideas to clients and information to contractors and workmen. The desirability of clean, accurate and facile draftsmanship cannot be overestimated.

With this much emphasis on the importance of good draftsmanship, greater emphasis, I believe, should be given to the fact that draftsmanship is not architecture. With all the proficiency the young man may acquire, he should forever bear in mind that draftsmanship is but a means to an end, and that end a *building*. Draftsmanship is a skill and drawings are merely tools for the architect. Therefore, he should eschew the "snappy" drawing, the "dolled-up" plan, the "tricky" rendering, and reserve display of decorative instincts and abilities for his buildings.

A gratuitous and mystifying "artistry" in drawing doubtless has contributed to the rather general notion, not unknown among architects, that the business of the architect is the making of drawings, that to be a good architect one must be an exceptional draftsman, that the young person who "likes to draw," or has skill at drawing, is cut out for an architect.

These notions are simply mistaken. Yet they are justified, in part at least, because of the architect's preoccupation with drawings as drawings. The architect should at all times be concerned with his building. He should constantly and keenly be aware of the inaccurate and inadequate ideas of a building which any drawing conveys. He should be sensitive to the fact that an obsession with drawings as drawing diverts the mind from the important task of holding the building, in its actual size, shape, substance and location, as clearly in mind as though it were a memory of an existing building.

Better a line drawing, that leaves the mind more free, at least, to dwell upon a building in its actual volume and form, and to work with that image, sensing its actual spaces and relationships, its solidity and construction, the color and texture of its materials, the character of its environment, and the movement of people in and about it. It is preoccupation with these things, not with drawings, that will determine his success as an *architect;* his success as a business-getter, as a money-maker, will depend not only upon that, but upon altogether different considerations not at present under discussion.

This reversal of interest, this thinking in terms of drawings, which clever draftsmanship has a tendency to encourage, is, for these very reasons, an ever-present and positive danger. It tends to deceive the architect—as well as his client—as to what the outcome of his mental image actually is to be. Many a building bears but a disappointing resemblance to the exciting and quite gorgeous drawings which were supposed to portray it. The easy use of color, of light and shade, deceptive entourage, the accent of some excellence, the obscuration of some deficiency, the happy point of a perspective, all too often mislead both architect and client, resulting in an unhappy awakening for the client, and a loss of prestige for the architect. How true, as some one has said, that a building should be more satisfying in effect than any preliminary drawings of it.

As clear, legible chirography facilitates comprehension of the meaning of the written word and allows the mind to concern itself wholly with the thought of which it is only the symbol, undiverted by any consciousness of either its merits or demerits, so architects' drawings should not, by any demand of their own, distract attention from the mental image of a building of which they are merely graphic representations. Unfortunately, any drawing has a tendency to do this more or less, for the reason that no drawing can convey the sum of the aspects of a building. A building is a composite thing of many planes, angles and materials, the effects of which shift with every change in the position of the observer, with every hour of the day, and every kind of weather.

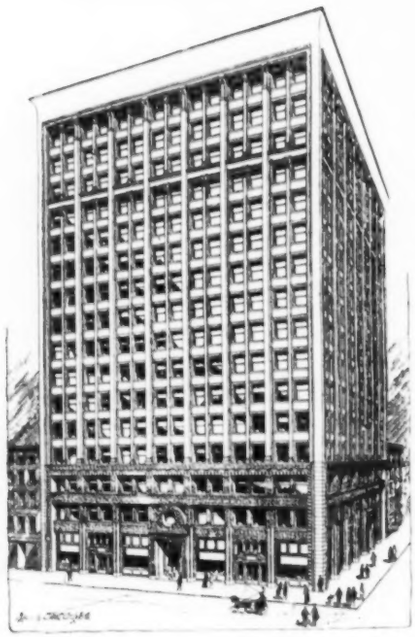
But the purpose of a drawing to an architect is to record the facts of spaces and forms which, *when put together* in solid materials, will result in the structure which he has conceived in his imagination. It is an instrument by means of which the building of his dreams is to become a reality—it is not otherwise a thing of importance from an architectural point of view.

Consider an elevation: it is a straight projection; even when carefully rendered with shadows cast—perhaps, with bright sunlit shadows that never fall on the shady side of some street—it affords a distraction difficult to dispel, while resort to perspective drawings encourages the practice of picking the most favorable

TWO DRAWINGS FROM THE ARCHITECTURAL RECORD OF 1905:

(1) Rockefeller Building in Cleveland
Knox and Elliot, Architects

(2) National Park Bank in New York City
Donn Barber, Architect



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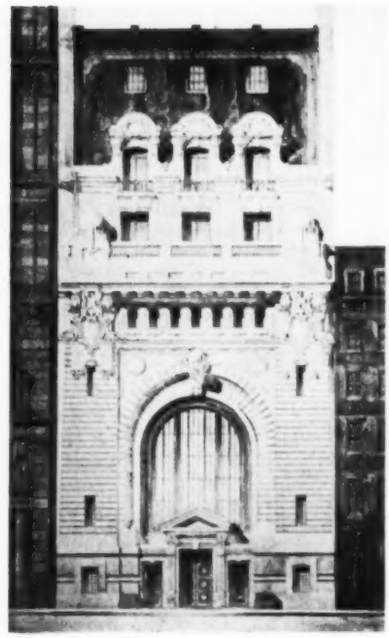

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point of sight, exaggerating merits while concealing defects. The power which such drawings have been found to exert upon possible and unwary clients has, undoubtedly, fostered that bane of the conscientious architect's life, as they have often been the undoing of innocent clients—free sketches; beautiful drawings intended to "land a job," without regard for the prospective client's needs, or the professional character of an architect's services.

Elaborate and spectacular architects' drawings, so familiar today, were scarcely known fifty years ago, when they first began to appear in numbers. Prior to that time, architects who were reputed to have been good draftsmen do not seem to have considered them necessary or desirable. Had they so considered them, examples of their work would probably have been preserved to us, as illustrations and paintings by celebrated artists of that period have been preserved to us. Certainly, no lack of a possible skill prevented their production. The circumstance creates the impression that their minds were too much engrossed with their buildings to think of drawings as other than memoranda of their spaces and forms.

Think of the simple character of drawings made by the architects of our own colonial period; of such records as we have of the work of architects of the Renaissance. Has there been such an improvement in architecture in our time, that it may be attributed to an improvement in draftsmanship? And, if draftsmanship determines the quality of an architecture, what glorious drawings were those which pictured the Gothic cathedrals, and from which they were made!

In their present character and esteem, drawings by notable draftsmen in the United States—architects and others—reflect the influence of the French School, where drawing has been so much emphasized. But in no country has this fetish for drafting superexcellence been carried to such extremes as in our own. It is recognized as a special field for artistic endeavor. In it, many men—architects among them—have attained a remarkable degree of skill, quite apart from, and usually in excess of, the merit of the architecture depicted.

So divorced from architecture did this worship of drawings at one time become, so unrelated to real architecture were its results, that the expression "paper architecture" was invented to designate the kind of work which that sort of practice turned out. There are, happily, signs that the methods of that period are passing, and that a more rational attitude towards the purpose and meaning of architectural drawings is taking their place.

It is well that this should be. More than in the recent past, attention may have a chance to be directed to buildings, instead of to drawings—buildings in their essential elements of space, form, materials, construction, color, mass and solidity. Also, it may restore to the public a salutary consciousness that architectural judgment requires a special training. Architects themselves act as though they believe that average citizens were competent judges of architecture, because they do not hesitate to have them judge of it from their drawings—in fact, they ask them to do so—while strangely complaining that the public is no judge of architecture.

Architects' enthusiasm for these superfine drawings is strange, furthermore, because they seldom make use of them in the process of designing. Their studies usually are of the roughest character limited to meager graphical indications, while working drawings are seldom more than clearly intelligible records of facts.

Some architects could not make a really respectable drawing if they wanted to do so. I have known architects, actual authors of buildings, who acknowledged they could not draw, and never did draw, yet who were accorded first places by, and among, their fellows, for the best executed work over a period of years in a large city. I have known of architects who did no drawing, yet the excellence of the work of their offices —attributed to "ghosts"—fell off immediately after

their deaths, although a high order of draftsmanship continued to prevail; a fair indication, it seems to me, that there is no *essential* relation between architecture and draftsmanship. Another indication might be, that with all the wonderful drawings of the decades from 1890 on, architecture of a genius equal to that of stacks of drawings turned out during that period is noticeable by its absence.

The reason for this must be because real architecture is concerned with buildings, and not with mere drawings and draftsmanship. So far as devices of the latter interfere with a consciousness of the actual structure, they are a hindrance, and it seems to me that the sooner this is widely appreciated by architects and draftsmen, the better it is likely to be for architecture. So long as the practice of architecture is regarded primarily as a business of making drawings, that draftsmanship is looked upon as a criterion of the capacity of an architect, draftsmen will be expected to display a very high order of drafting skill, and be able to produce "smashing" drawings, until, in their turn, they will lose sight of the realities of architecture.

The mania for "fine" drawings as a prerequisite to the practice of architecture, in some instances, has blinded architects to its effects upon themselves. I have observed architects who were judges of competitions, so "carried away" by the super-excellence of drawings, that they failed to detect gross faults in the architecture—inconsistencies of plan and design—they were engaged to judge. I have seen lay judges overlook the superior architecture of a design submitted—in fact, entirely overlook the simple line drawings submitted to explain it—their attention being seized by the spectacular drawings submitted by other competitors.

It may be that this passion for drawing as drawing came about because architects in the generation during which it developed were occupied with revivals of about every historic style of architecture anywhere in the world discoverable. Documents replete with every known motive and detail issued from the press in an endless series. Invention almost disappeared—indeed, by some it was frowned upon as the mark of an architectural bolshevik. "Adaptation" became the general practice, and a varying thing called "taste," as the criterion.

It is not hard to see how the reiteration of hackneyed models produced an unconscious weariness for spirits naturally creative, that would seek outlet in the exercise of skill, and the enjoyment of the beauty of superlative draftsmanship; especially, since this would be likely to win for them reputations as artists—yea, even as architects, because they could "draw."

The public accepted this criterion, that an architect was one who made "pretty pictures" of buildings, but added a corollary that he was not "practical." With what result? That the services of an architect were a luxury? That buildings could be built without the services an architect was supposed to render? That an architect "sold drawings" on a commission basis, instead of performing professional services for a professional fee? And that now, in order to convince the public that an architect is a useful member of society, the attempt is being made to persuade it that he is a "business man?" That *he* should be consulted for advice pertaining to investments, loans, mortgages, insurance, promotions and real estate? If he only realized the consequences of all this to architecture and to architects!

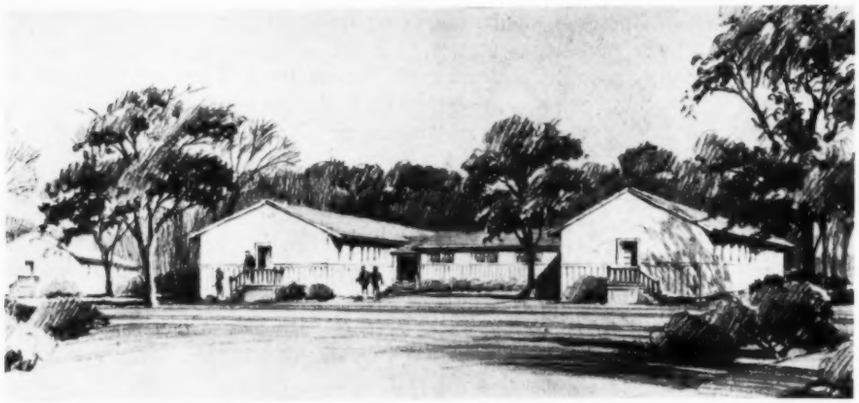
In order to obtain commissions for a share of the buildings to be erected, architects today are beginning to rival the modern drugstore in the assortment of extraneous services they are undertaking to dispense; taking on, at the same rate of pay formerly received for purely architectural services, work and responsibilities that, as architects, they are temperamentally unfitted to assume; or, as an alternative, seeking salaried clerkships in government or corporation offices where architectural work is done.

They have disqualified themselves for, at least, one class of work—small houses and minor business premises—which, by their attitude towards it because of its low cost, they have taught possible clients they neither care to do, nor can do profitably, for them or themselves. Yet, actually, no class of work so much needs the services of the real architect—needs it because with little to be spent, the most should be made of the money available. Who, indeed, but a real architect has the knowledge, skill and experience, to better serve impecunious clients? It is in connection with their projects that architects should be able to demonstrate real worth in the whole field of building. Instead of that, they agree that they cannot "make money" on such work, and blithely turn it away by the millions of dollars worth, to the everlasting detriment of towns, cities and countryside.

Is it not time that architects should realize more fully what it means, that they constitute a *profession*, whose business it is to advise upon all such matters; that its members are equipped to advise clients of whatever financial standing, with respect to building operations of whatever sort, to the advantage of both client and architect, at a fee that will yield a reasonable return for the labor, skill and responsibility necessary to be devoted to them? Is it not time that architects should be more fully alive to the fact that the practice of architecture consists of analyzing and coordinating building requirements, devising and delineating the construction, services and expression of buildings, preparing documents necessary for their erection, in clear, concise, complete and accurate explanatory form, with a view to genuine economy, and of thoroughly supervising their erection—and not subordinate these vastly more important things to the fact that in pursuing their work, they make use of drawings?

How unrelated to these operations is the *essentiality* of superfine draftsmanship? Praiseworthy architecture is the outcome of a vivid perception of actual structure—plan, construction and design—in its actual environment. Good architectural practice requires only such skill as may be necessary to set it forth in a fashion to be easily and correctly understood by all who may be concerned with its production—which is the end and aim of the architect's real work. The architect's real work is not primarily the business of "making drawings," but the conceiving, illustrating, and directing the execution, of *buildings*—the mental image of which he alone first beheld.

ILLUSTRATED NEWS

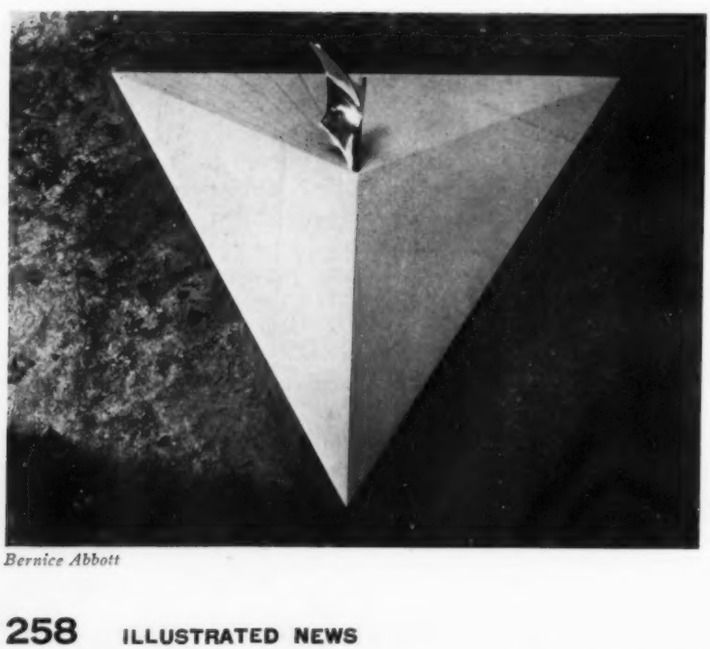


Artist's view of completed bunkhouse, accommodating 150 men, now being erected at Pickwick Village, at the south end of Pickwick Landing Dam site, by the Tennessee Valley Authority.

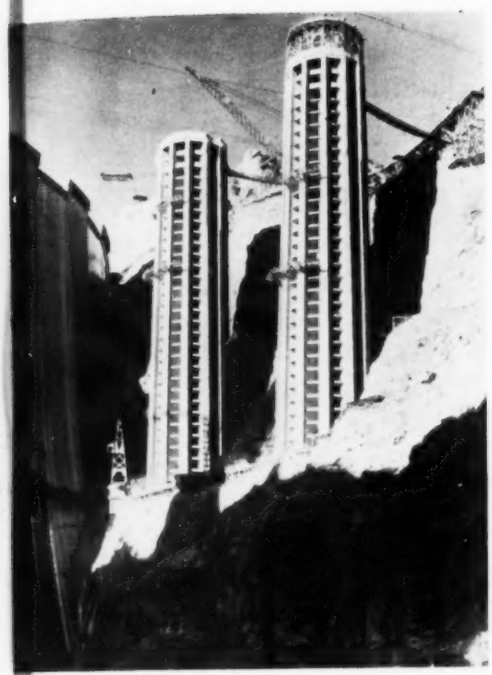
Luckhaw Studio

Gold Medal Award in the Better Homes in America competition—a cellular copper-bearing steel house at Altadena, Calif., designed by Richard J. Neutra, architect, and Gregory Ain, collaborator.

Models of two designs by Isamu Noguchi, sculptor: (Left) "Monument to the Plow"—proposed location in the West Prairie—a triangular pyramid (12,000 feet along base) made of earth, one side tilled in furrows radiating from base corner, another side planted to wheat, and third side half-tilled and half barren soil, with large block of concrete and large stainless steel plow at apex. (Right) "Play Mountain"—proposed location on Manhattan—a structure of steel, glass, brick and reinforced concrete, providing space for children's climbing exercises, wading pools, water chutes, band concerts, sledding in winter, dressing rooms and gymnasium.



Bernice Abbott



Ewing Galloway

Aerial Explorations, Inc.

(Above) Penstock towers at Boulder Dam. (Right) New office building unit nearing completion at Rockefeller Center, New York City—Reinhard and Hofmeister; Corbett, Harrison and MacMurray; Hood and Fouilhoux, architects.

Perspective drawing of Gordon Strong Building, Washington, D. C.—Holabird and Root, architects.

Fred Eggert

A proposed building which Albert Kahn, architect, has suggested as a Detroit project in connection with the Federal Government's $4,880,000,000 work relief program. It would serve as a combined City administration building, convention hall and railroad station.

"WHAT DOES THE ARCHITECT HAVE TO OFFER?"

By WM. L. STEELE, Architect

The late Thomas R. Kimball used to say that he often wondered why in meetings or conventions of architects so little was ever said that indicated concern for the interests of the client. He believed that, as a professional man, the architect's chief duty and responsibility was to his two clients: first, the community or the public; second, the individual client; last, himself.

During the trying years through which we have been passing we have been more and more concerned with our own problems. They have ceased to be problems and have become troubles for many of us, which makes it still harder to maintain the professional point of view. Perhaps our old professional ideals need re-illuminating. Maybe our faith in ourselves as professional men needs to be re-established. We may even need a kind of religious "revival."

Saint John the Evangelist, tradition says, lived to be very old, and as he grew feeble he shortened his sermons. In substance he said every time he preached: "Little children, love one another." Am I being too personal if I suggest that we architects need to ponder Saint John's exhortation? We are criticizing each other hammer-and-tongs, and there seems to be some truth on both sides, or I should say, on all sides. But I cannot discover that we are quarreling over any vital principles, and unless principles are vital, are they worth fighting for?

In the client's interest—"But," some one says, "we have no clients, so what?" Had it occurred to some one that perhaps the clients are neglecting us because we first neglected them? Not all the difficulties in which the architect finds himself today were caused by the "depression."

Some years ago George Jean Nathan contributed to *The Smart Set* a penetrating and satirical résumé of popular beliefs and superstitions. There is always a basis for the opinions of the man-on-the-street, however funny and unfounded they may seem to some of us. If we architects could know what our past-actual and future-potential client, the public, thinks about the architectural profession we could check that knowledge against our duties and responsibilities and find out if perhaps we have failed somewhere. . . . And here, let me digress, and say that I am well aware that the "education" of the public has been a popular topic at conventions for many years. Not so popular, however, has been that other topic, "the education" of the architect.

I have begun with the assumption that the architect is a professional man. I may not have said so directly, but it is so in my mind. I know that there is not quite unanimous agreement on that point. Some say that the architect, to be "successful," must be a business man; that he may or may not be "professional" as he pleases. The word "professional" is hard to define anyway. Vitruvius set out a long list of qualifications which he thought were necessary for an architect. We may not have entirely agreed with Vitruvius, but we have never made any very emphatic disclaimer of his soft impeachment.

Is it for fear of losing face as "leaders in the building industry" that we have allowed it to be said that the architect must know, and therefore does know, everything there is to know about building? When we think about this we realize that it is a grave handicap. No one is deceived by it. We are not all versatile. Not all of us are even Jacks-of-all-trades. None of us has had direct and personal experience with all of the myriad types of buildings that have developed since we went to school. We know that it is not possible for any man to acquire even a passing acquaintance with everything there is to know about the science of building, to say nothing about the art.

May not this too-broad assumption of omniscience have weakened popular faith in the architect? I do not mean to imply that the architect should not be interested in all these things. On the contrary let him seek such knowledge perpetually. Let him be public spirited, a good citizen. Let him study sociology, economics, history. Architecture, scientifically viewed, is a personal expression which has its roots in the social fabric. As we, the people, are, so also are our buildings.

A cynical attitude toward our country and its people is not going to foster a true professional spirit. Some of us, remembering what P. T. Barnum said about the American people, seem to have acquired a tinge of the Barnum attitude. We have seen how, when architects were in demand, any young fellow who had the nerve could call himself an architect and get a job. All of which naturally has tended to discredit the profession as a whole. Nevertheless not all of us have been discredited. At least such is our hope. By various paths, more or less arduous, we have become architects, and we have various ways of proving our claim as such.

We do not all agree on definitions, which is unfortunate, for it causes confusion in the client's mind, but there ought to be a few basic principles which we can all accept. Suppose we consider the architectural attributes which are most essential to the client's interest, and omit anything that has to do with making the architect an imposing figure.

The first essential, it seems to me, is that the architect be a professional man. This, to my mind, is a fact and capable of proof. Only so can the client have the benefit of honesty and candor—not part of the time but all the time. Only so can he receive impartial and authoritative advice. Only so can he get the sound assurance that what is built for him is what he thinks it is. Only so may the client know that what he pays the architect is all that anybody pays him. Only so may the client know that there are no "entangling alliances" between architect and contractor, architect and manufacturer, architect and real-estate promoter, architect and bond-salesman. Assuming that the client's interest is not subversive of the public interest, the client may rest assured that no other interest stands between himself and the architect.

The client may also know that the professionally minded architect has only one standard of performance, his best. He may even contemplate the strange and elsewhere unmatched phenomenon, that the harder the architect works to save his client's money, the less he is paid. This is perhaps the crowning paradox in the professional attitude, due not so much to unselfishness or altruism as to the absurd system in vogue of basing the architect's fee upon a percentage of the cost of the building. All of these considerations make a fairly strong case for the proposition that the interests of the client are best served by a professional man. It may be disputed only on the ground that occasionally one finds a thoroughly honest contractor or builder of the old school, who, without claiming to be a professional man, nevertheless has the professional spirit, and does for the client practically everything that has been enumerated in the foregoing paragraph. So we must carry our discussion further.

As things are, if the public does not admit the professional standing of the architect, it is probably because the public has not seen enough evidence of the professional spirit in the current practice of architecture. In support of this, one may take a leaf from Mr. Nathan, and cite a group of popular misconceptions which have to do with the architect's professional standing. Most of them are quite familiar:

"The architect is no different from a contractor, or if he is, the difference is in non-essentials."

"The architect may be bought, and should not be trusted beyond certain fixed limits."

"The architect needs to be told what to do, and held to that program."

"The architect will run up the cost of his buildings to increase his fee."

"The architect may be induced to compete with other architects in the matter of price. Architects are all about alike, so why not employ the man who will do the work for the lowest figure?"

"The architect is not a necessity, but a luxury which only the rich can afford."

"The architect is not interested in small projects. He merely adds to their cost and should be eliminated."

And there are many others.

I maintain that these wisecracks have not invented themselves. The fact that we have all heard them would indicate to me that men who have called themselves architects have done the things upon which these unpleasant generalities are based. How can we refute them? Not completely and effectively by denying them. I fear we shall have to try to live them down, and I believe that it is entirely possible to do so.

When we have agreed to give up the myth of architectural omniscience, and have further agreed that our title to professional standing is not quite secure, what have we left? What do we have that no one else has? If there is such a thing, will it not of its very uniqueness be something of great importance? Will it not directly and deeply affect the interest of the client?

We have seen the art of building supplanted by the business of buildings. How else the quantity-production of houses, large and small, by real-estate promoters and the speculative builders? How else the vast amount of building done for certain large corporations by their "engineering force"? How else the "stock-plans," the "mail-order architects"? On what other assumption could a great government solemnly decide that its national buildings would be best designed by a "bureau"? What happened to bring this about?

Not formally, not deliberately, but gradually, little by little, the profession of architecture and the architectural schools have lost faith in the art of architecture. It really happened long ago. We of the generation now classed as "middle-aged" were started off in our student days copying ancient details. We were led to believe, by inference at least, that the best possible had already been done. There was no suggestion that we might hope to emulate the old masters. We must rest content with imitating their work. It was a bigger thing than this, that, or the other professor's opinion. It was a tidal wave of an acquisitive and predatory age responding to the challenge of the machine and mass production. How could buildings be supplied in great enough numbers to meet the demand if there were no way to make the exacting and difficult work of the architect easier? To design in the old sense took too much time. Why bother with it when we had the treasures of the ages in our libraries? And so we copied, adapted, "composed," and the purist in the office (there was always at least one) made us prove that we had a "classic precedent" for anything we drew that struck him as smacking of modernity.

I do not want to be understood as affirming that every architect has failed to fight against that terrific pressure. There have been and still are a good many rebellious spirits. Louis Sullivan was the great rebel, and his influence is now in the ascendant. Some architects have been and are doing fine and spirited things, but the main drift has been opportunistic or downright reactionary. Whatever the cause the architectural profession as a whole has not been designing "organically" or "functionally."

Art is organic if it is anything. We have therefore lost touch with the art of building, and have allowed its beautiful science to become a slave to big business. The engineers can do academic designing about as well as we can. The draftsmen soon learn all the tricks. Not much more than speed and quantity has been de-

manded of the architect by the American people. The husk, the empty shell, the external appearance, the pictorial aspect, the stylistic implications are mostly what have seemed to matter. These have been deliberately sought for, bought and paid for. Small wonder that in an era of chain stores the clients have found out that the architects have no monopoly on the production of the kind of buildings on which has been set the rubber stamp of the business of architecture.

We return to our question: "What does the architect have that no one else has?" The answer directs us back to the earliest traditions of great building, back to the source of all great art—"Man's Will and Power to Build," as Louis Sullivan expressed it. Where the masters found their inspiration we too may find ours. We are not ready to accept the frightful implications and consequences of our too-good-natured years of servility. We should like to feel that our feet are set upon the path to the Promised Land.

What else can answer our question but a genuine re-birth of natural, sane, logical, organic, functional design, in which the creative faculty is permitted to take its divinely appointed place. The engineers will take off their hats to us if we can occupy those heights. To design in the arduous sense that implies setting free the creative faculty is impossible for any but an architect who believes in his art, is in love with it, has devotedly and whole-heartedly pursued it. This is a hard saying, but how else is a vital architecture to be achieved? How else can architecture truly express the tremendous gains in scientific achievement that have been made? How else can architecture express the American people—not as money-grabbers, cynical, selfish, dishonest, but as the rightful inheritors of a free government, the inspiring kind of government that we believed in when we were small boys?

If we are so minded we may disavow all pretense. We may frankly admit that we are not engineers save by sympathetic understanding. We may with equal frankness let it be known that we are still students and eager to absorb all the knowledge we can of the new materials, new methods. We must keep in touch with what is going on. We must know accurate sources of information as to the newest methods of teaching, latest standards of hospitalization, today's problems of the merchant, the manufacturer, the landlord, the city.

When we have a problem to solve we must spare no effort to reach all its modifying conditions. It is the architect's responsibility to solve problems in an authoritative way, and the hope for him as an essential element in our civilization is that he will solve them as an independent unbiased thinker, a critic, and an artist, and not as somebody's hired man. The real architect will not know everything, neither will he be an ignoramus. He will not experiment with the client's money. He will study his locale, his available materials, their advantages and their limitations. He will become thoroughly at home with his client's needs. He will analyze them, interpret them, express them in terms of building. And he will never forget to strive for the vital spark which he must, if he is worthy, give that building when he finally determines its character and form. He will not be satisfied with a hasty "thumbnail" sketch, which however amusing to the client at the moment is a rash and presumptuous gesture. He will really *work* to the fullest extent of his powers on the preliminary study that he makes. He will make study after study, plan after plan, condensing, eliminating, organizing, rejecting, and gradually the image of the building as a complete identity will begin to shine in his mind.

As we grow older we begin to see that our own little span of years has not been very significant. We know that the present economic troubles will pass. We have faith that the fundamental human urge toward the intangible higher values will always exist. The ancient love of beauty will return. Our young men are looking to us for some hint of a serene confidence in the future. Even though we may have to reconstruct our philosophy let us not evade the responsibility. Youth will be served, and we oldsters who are still young in spirit will not obstruct its way.

Better architecture must be produced somehow. It will be produced, if not by architects so called, by some other agency more worthy of that name. It is already being talked about. To quote a friend: "Ours has become an architecture of clichés and tricks in design. There is need for a more thorough study of the working-out of the plan toward the achievement of complete suitability of the building to its purpose." There are new types of buildings which are clamoring for adequate expression. There are old types which have outlived their usefulness. Said my friend, "Architecture should be continually improving.—Teaching methods, ways of living, therapeutical values of light, etc., new systems of construction, new materials—all would have a reflected value in an architecture created with sympathy for obtaining the utmost in pleasantness, healthfulness and convenience."

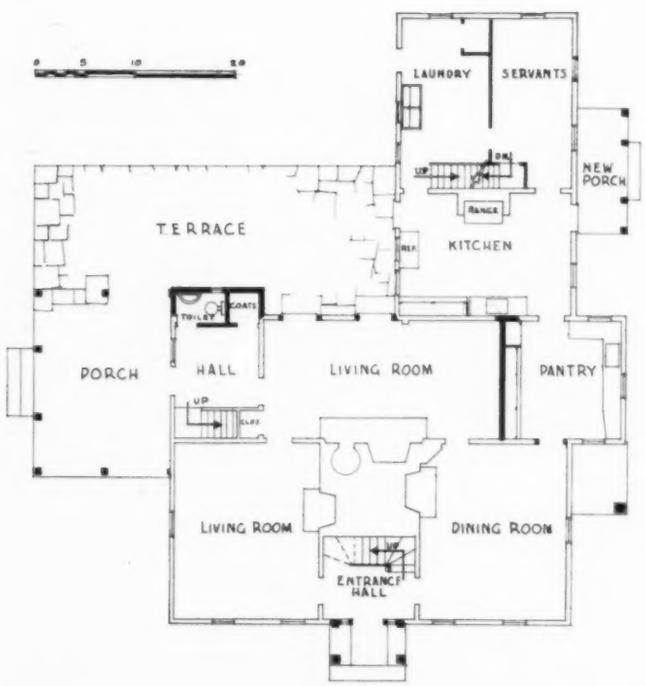
Is it not clear that along these or similar lines lies the hope of architecture, the best interests of the client and the architect alike? It is imperative that we renew our faith in a true and vital American architecture, not the business, but the art. Our dream may become a reality sooner than we think. Let us join hands with our young men and all be enthusiastic about it together!

PORTFOLIO

OF CURRENT ARCHITECTURE

REMODELED HOUSE

OF CHARLES DUPEE AT SOUTHPORT, CONNECTICUT — CAMERON CLARK, ARCHITECT


LAUNDRY
SERVANTS
NEW PORCH
TERRACE
KITCHEN
RANGE
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TOILET
COATS
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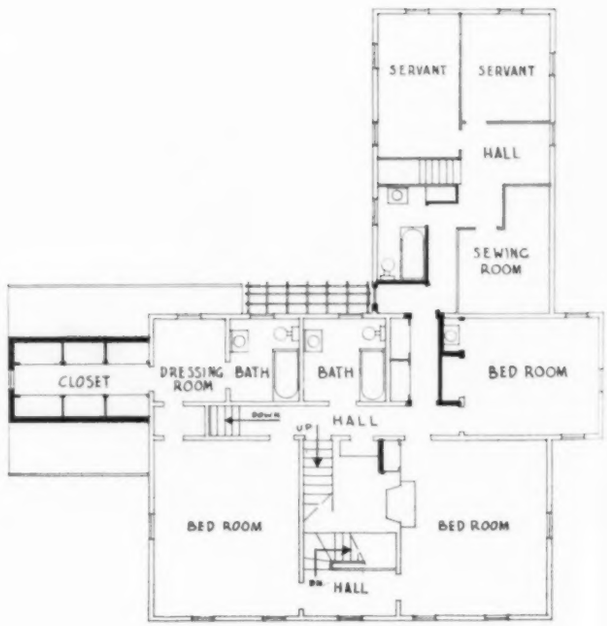
DINING ROOM
ENTRANCE HALL


SERVANT
SERVANT
HALL
SEWING ROOM
CLOSET
DRESSING ROOM
BATH
BATH
BED ROOM
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BED ROOM
HALL

HOUSE OF CHARLES DUPEE AT SOUTHPORT, CONNECTICUT — CAMERON CLARK, ARCHITECT

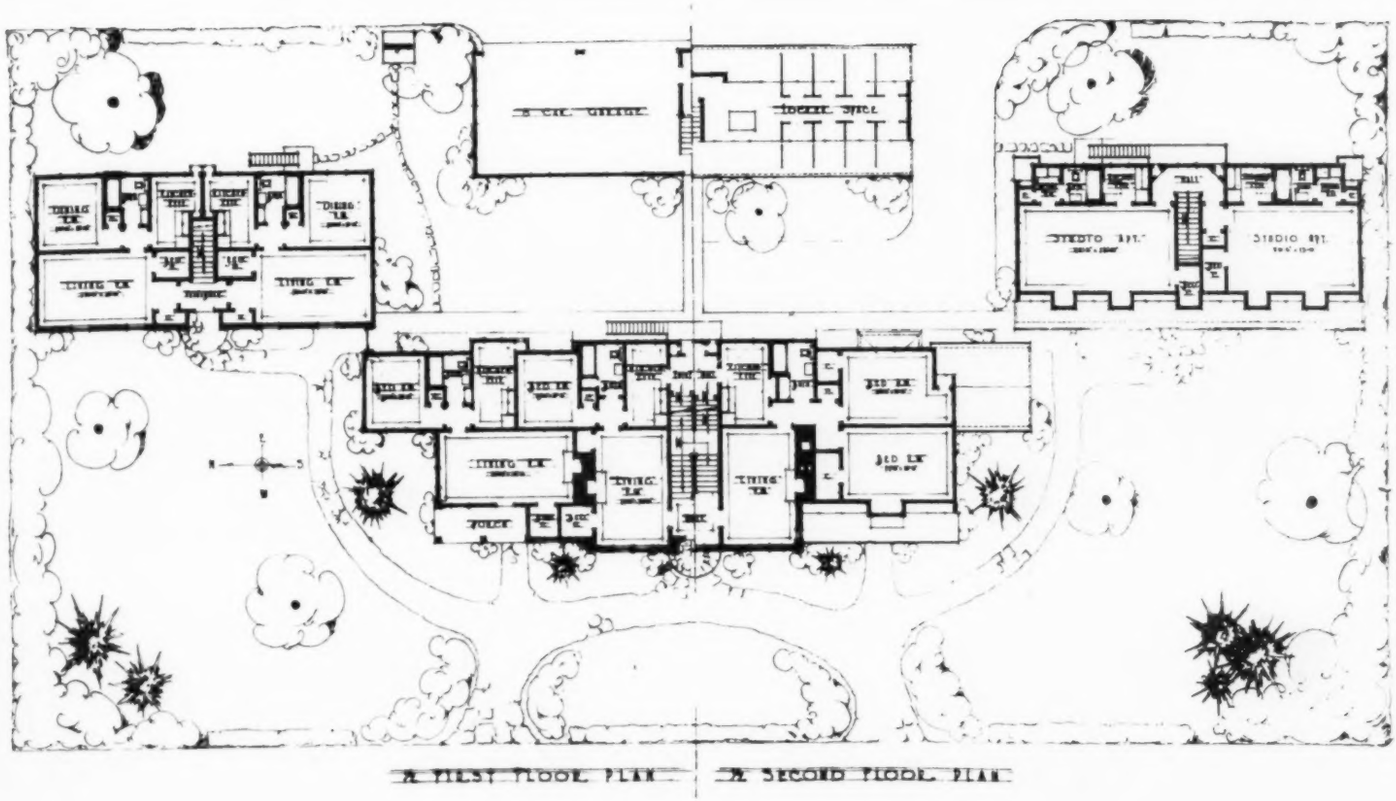
HOUSE AFTER ALTERATIONS

HOUSE BEFORE ALTERATIONS

HOUSE OF CHARLES DUPEE AT SOUTHPORT, CONNECTICUT — CAMERON CLARK, ARCHITECT

THE ELLIOTT APARTMENTS FOR FRANK E. BALL AT MUNCIE, INDIANA

The group includes four buildings containing, in all, fourteen apartments. The center building has six apartments, four of which are entered from the main entrance, and the remaining two have private side porticos. Two smaller buildings are set back and contain four apartments each, all opening into a center entrance and stairhall. In the rear is an 8-car garage with spacious locker space overhead for storage use. Cost of apartments: $62,000, inclusive of all equipment, but exclusive of cost of lot. The construction above ground is frame, completely fire-stopped and insulated with rock wool. The first floor is reinforced concrete. The buildings are heated by vapor in concealed radiation, supplied by a stoker-fired boiler in basement; center portion of the main building only is excavated. Exterior materials are local stone in varying shades of blue, gray, cream to brown, laid with wide white joints; common brick; shingle siding and tongue and groove siding. The roof is slate in weathering greens, grays, sea greens and blacks. The shutters are painted bottle green. All wood and brickwork are painted flat white.



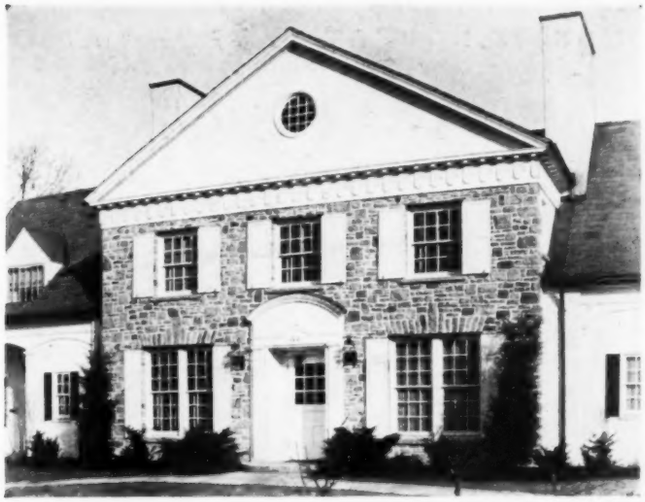
A FIRST FLOOR PLAN — A SECOND FLOOR PLAN

DEVOL ERNST, LANDSCAPE ARCHITECT

HERBERT F. SMENNER, ARCHITECT

ELLIOTT APARTMENTS

MUNCIE, INDIANA



HERBERT F. SMENNER

ARCHITECT

HOUSE OF ROBERT M. BROWN AT CHESTNUT HILL, PHILADELPHIA

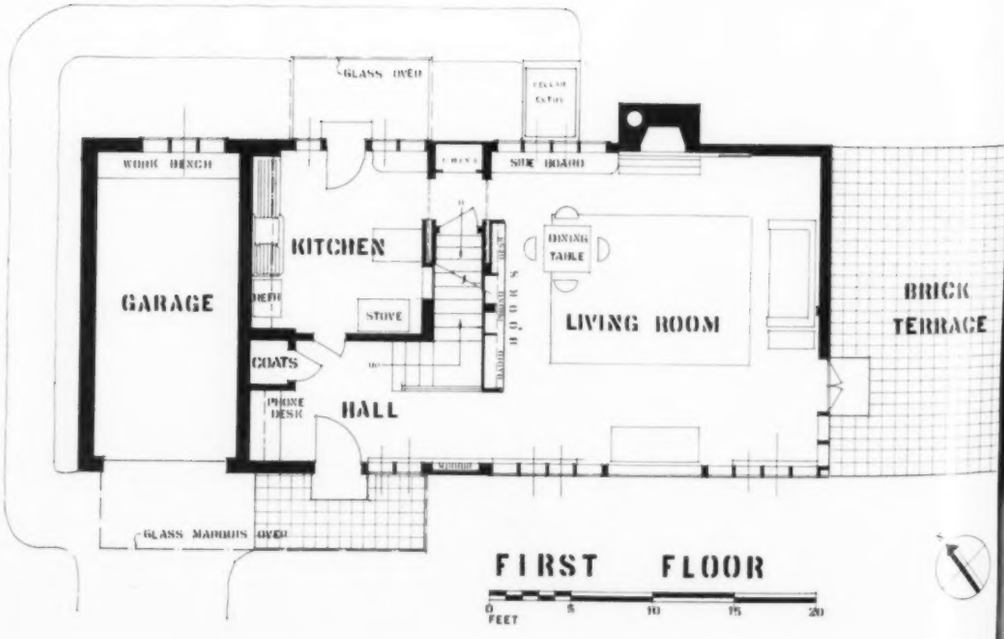
In building this house materials were studied for beauty, permanence and easy fabrication. Wood was chosen as the most flexible and pleasing, as well as the most economical. Many details associated with boat construction were used, giving a compact solidity in construction with a minimum loss of useful space. Wherever possible, structure and finish were combined in the same material. Twelve-inch redwood boards screwed horizontally to light framing combine pleasing appearance with considerable structural value, as well as being extremely durable as finish and moderate in cost. The window construction is an adaptation of the idea of prefabricated wall panels, and combines the wall structure with both interior and exterior finish. The steel casements were placed after erection, but could easily have been installed before. All millwork was fabricated at the site by the owner (the designer) and one assistant on two simple machines, permitting careful selection of material. Many special woods were used.

Photographs by F. S. Lincoln

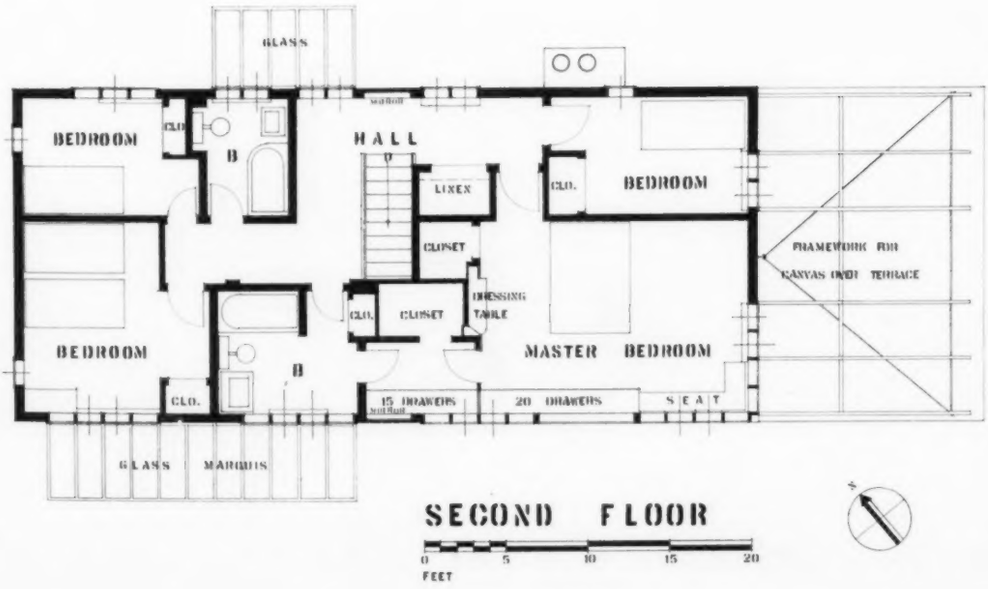
Photographs by F. S. Lincoln

ROBERT M. BROWN
DESIGNER—BUILDER

The living room, its relation to the rest of the house and the outside, is the main feature of the design. A separate dining space was considered unnecessary and undesirable. The hallway and stairs were placed with a view to gaining privacy in the living room and access upstairs from the kitchen. A combined recreation room, bar, and workshop, occupying most of the basement, provides secondary living space.



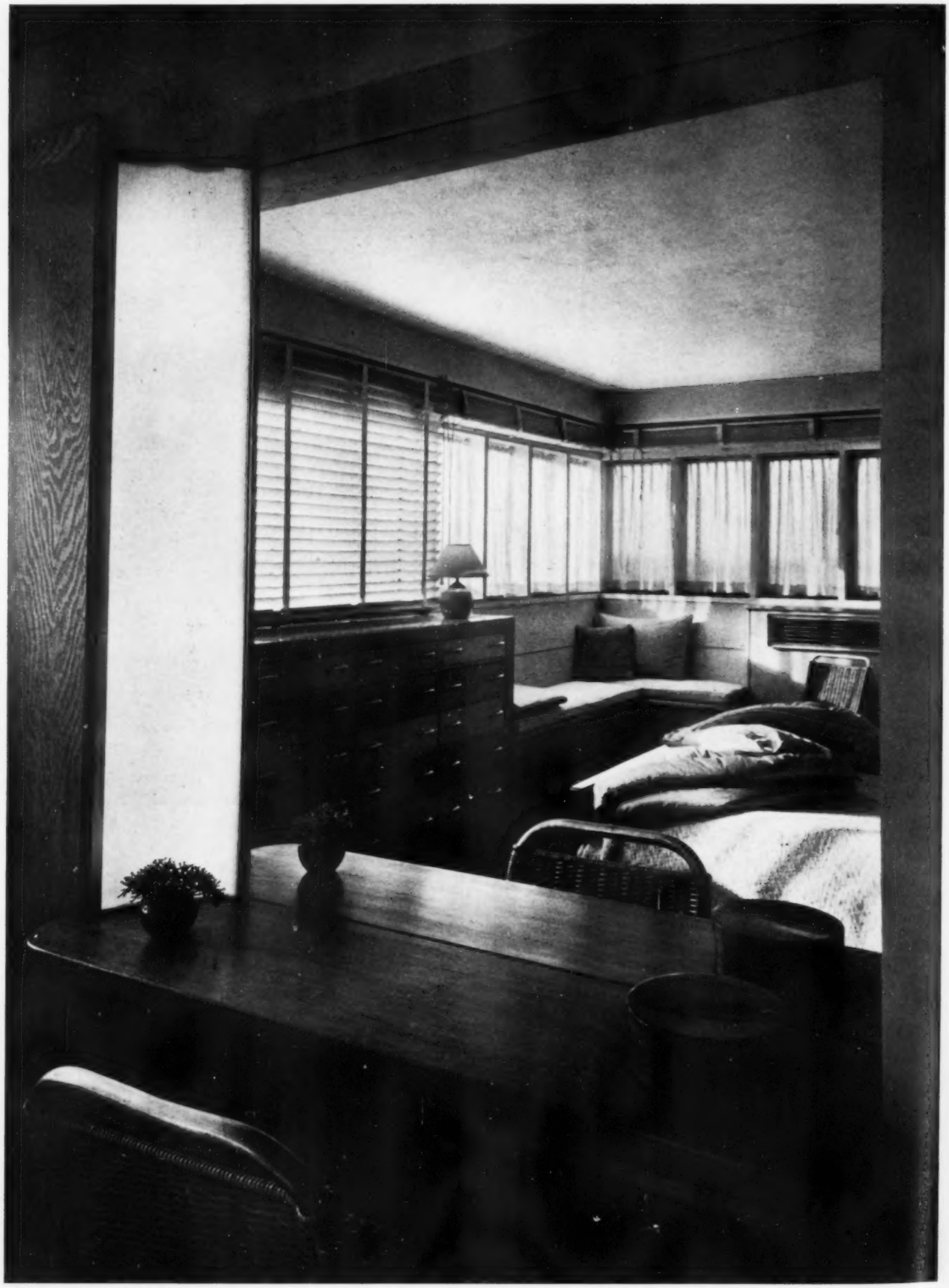
HOUSE AT CHESTNUT HILL, PHILADELPHIA



SECOND FLOOR

0 5 10 15 20
FEET

The owner's bedroom, dressing room and bath are of comfortable size and provide ample facilities, while the other bedrooms and bath are held to rigidly minimum dimensions. The positioning of bathrooms and kitchen centralizes all plumbing, reducing the cost and minimizing the damage from possible pipe failure. Copper water tubing is used throughout.



Photographs by F. S. Lincoln

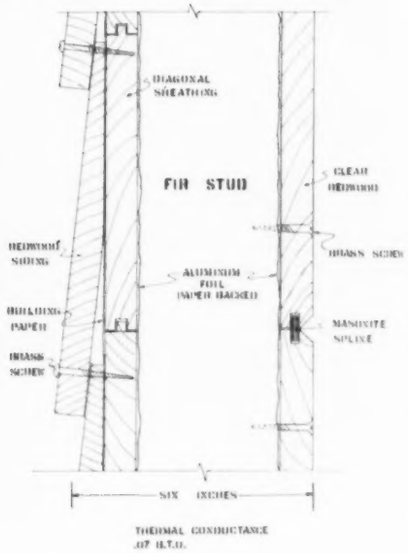
OWNER'S BEDROOM

HOUSE AT CHESTNUT HILL, PHILADELPHIA

VIEW INTO LIVING ROOM

ROBERT M. BROWN, OWNER, DESIGNER AND BUILDER

TYPICAL WALL SECTION



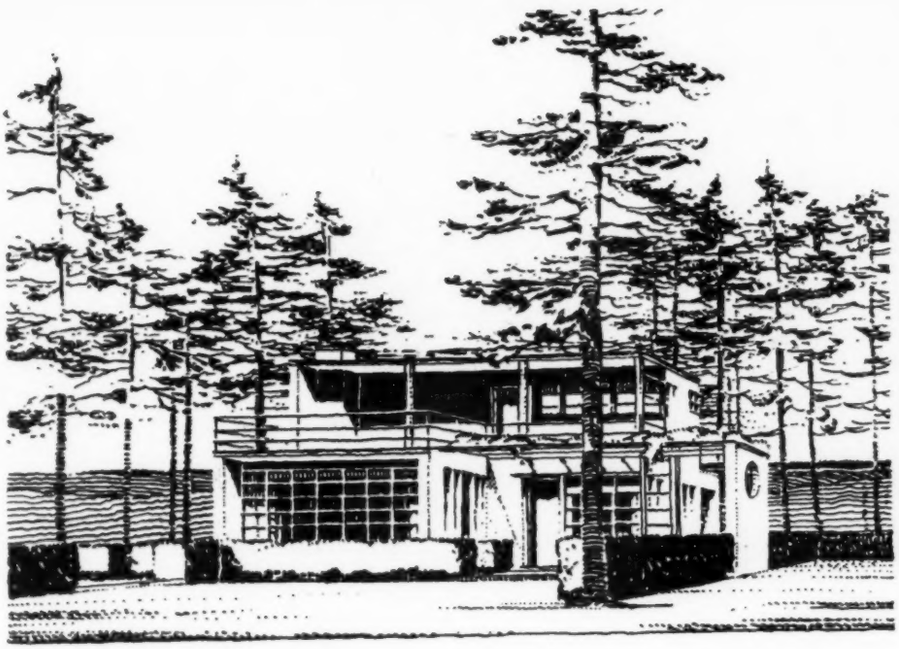
HOUSE DESIGNED, BUILT AND OWNED BY ROBERT M. BROWN
CHESTNUT HILL . . . . . PHILADELPHIA

The structural design of stairs and surrounding framing was worked out in conjunction with the placement of recessed mirrors, roof drainage line, cupboards, bookcase, and radio speaker. The framework of horizontal bookshelves and cabinets below was used as the structural foundation for finish in the stairs, reducing the wall thickness to less than 2 inches. The slag roof is pitched very slightly (1/8" in 1') to a central drain, and structural provisions have been made for later development of an exterior stairway and tiled roof terrace. There is no parapet and all roof flashing is eliminated by using a galvanized steel angle iron to make the joint between roof and sidewall.

Floors: Diagonal subfloor laid over entire areas of first and second floors (there are no bearing partitions) in casein glue and nailed; half-inch sound deadening board; then finish floor (wide plank—white oak downstairs, pine painted upstairs) is screwed through insulating board to subfloor.

Interior walls: Kitchen: 3/4" plywood. Master bath: carrara glass. Second bath: tempered Presdwood, spar varnished and enameled. Bedrooms: 12" redwood, painted. Living room and halls: 12" redwood—brass screws and natural wax finish. All ceilings: painted Homasote.

Aluminum foil on paper backing (Reynolds) is used throughout to provide maximum insulation at low cost. The fuel cost is extremely low. Heating is by hot water, low temperature system, using concealed indirect radiation, burning low-cost coal without blowers or pumps. Two standard 10" steel pipes 18' long, with lower ends flanged and anchored in masonry eliminate all fire hazard and leakage 6' above grade. Aluminum hoods, projecting 8 inches over windows, stop vertical summer sun and pass horizontal winter sun. Hoods over front and back doors: oak and steel frame, with half-inch rough plate glass over. Flat, truck cover canvas is stretched and roped on redwood and aluminum tube frame over terrace in spring, removed in autumn. Cost: About $8,000.



GRAND PRIZE IN CLASSES A AND B

HAYS AND SIMPSON ARCHITECTS

GRAND PRIZE IN CLASSES C AND D

PAUL SCHWEIKHER, THEODORE W. LAMB ARCHITECTS

GENERAL ELECTRIC COMPETITION AWARDS

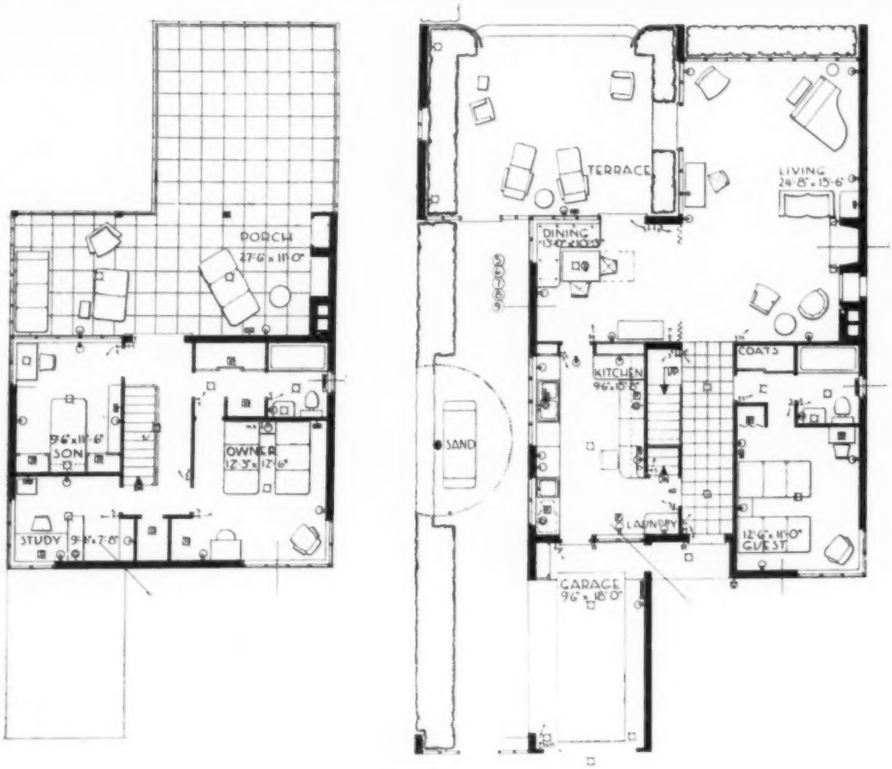
Architectural firms in Cleveland and Chicago shared the two grand prizes and architects in New York carried off the two first awards in the home electric architectural competition sponsored by the General Electric Company in cooperation with the Federal Housing Administration. The contest opened January 1, continued 10 weeks, and more than 2,000 sets of plans were submitted from every state in the union.

A total of $21,000 was awarded in 52 prizes. The two grand prizes, each for $2,500, were awarded to Hays and Simpson of Cleveland and to Paul Schweikher and Theodore Warren Lamb of Chicago. The two first prizes, each for $1,500, were awarded to Stephen J. Alling, a young architect who finished his studies at the Massachusetts Institute of Technology a year and one half ago, and to J. Andre Fouilhoux and Don E. Hatch, jointly, both of New York. Mr. Fouilhoux was a partner with Raymond Hood, until the time of the latter's death, and it was during this association that this firm designed many of the country's famous buildings, such as the Chicago Tribune tower, the Daily News building, Radio City, and the McGraw-Hill building in New York.

Four second prizes, each for $1,250, were awarded to Ralph H. Burkhead, Richard C. Hoyt and Angelo Messina, jointly, of New York; John Ekin Dinwiddle of San Francisco; Arthur Martini and Jonas Pendleburg, jointly, of Flushing, L. I.; and to Richard J. Neutra of Los Angeles.

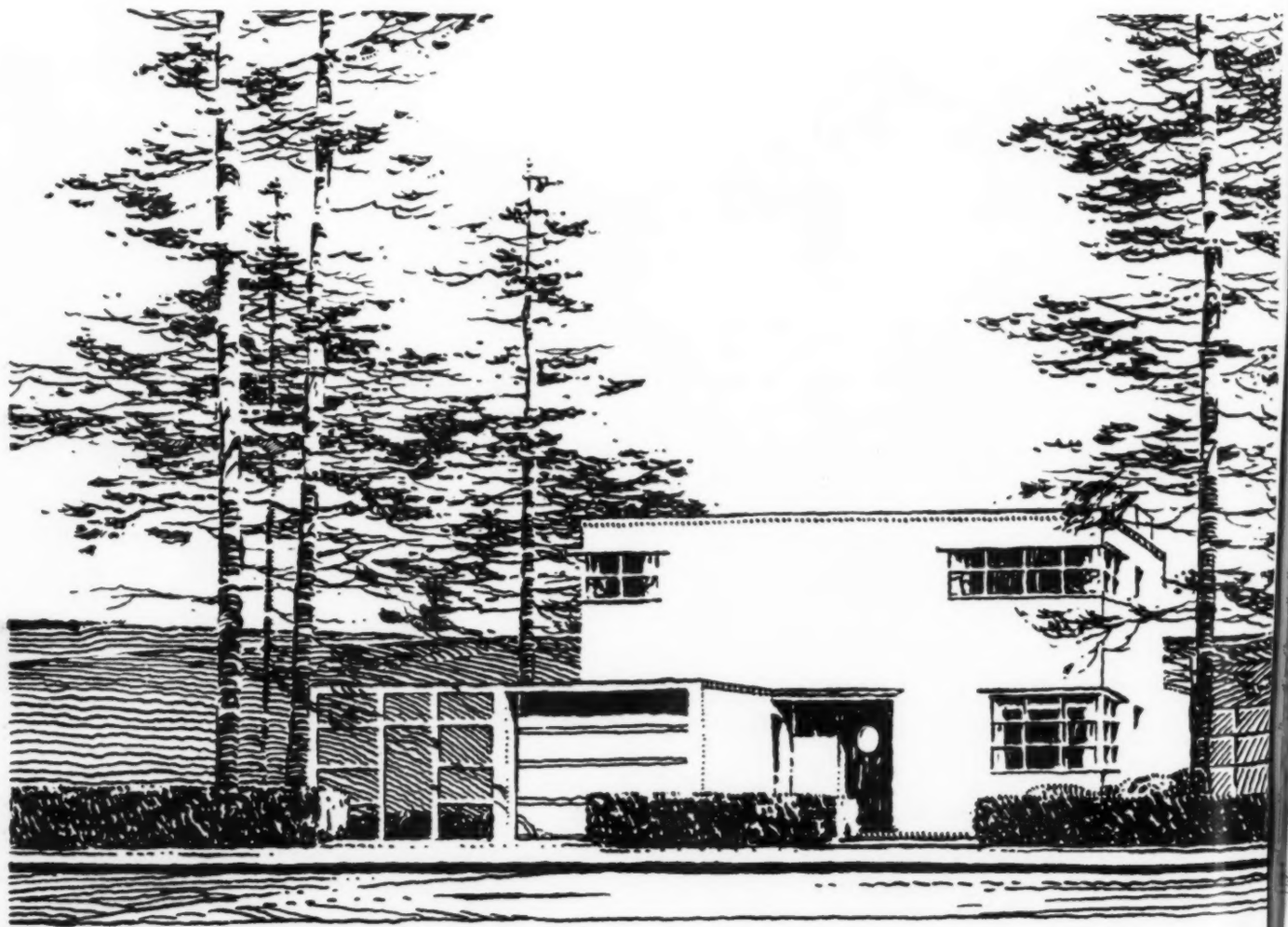
Four third prizes, each for $1,000 were awarded to Verner Walter Johnson and Phil Birnbaum, jointly, of New York; Herman A. L. Behlen, Ardsley, Pa.; John Hironimus, of New York, and John Donald Tuttle, of New York.

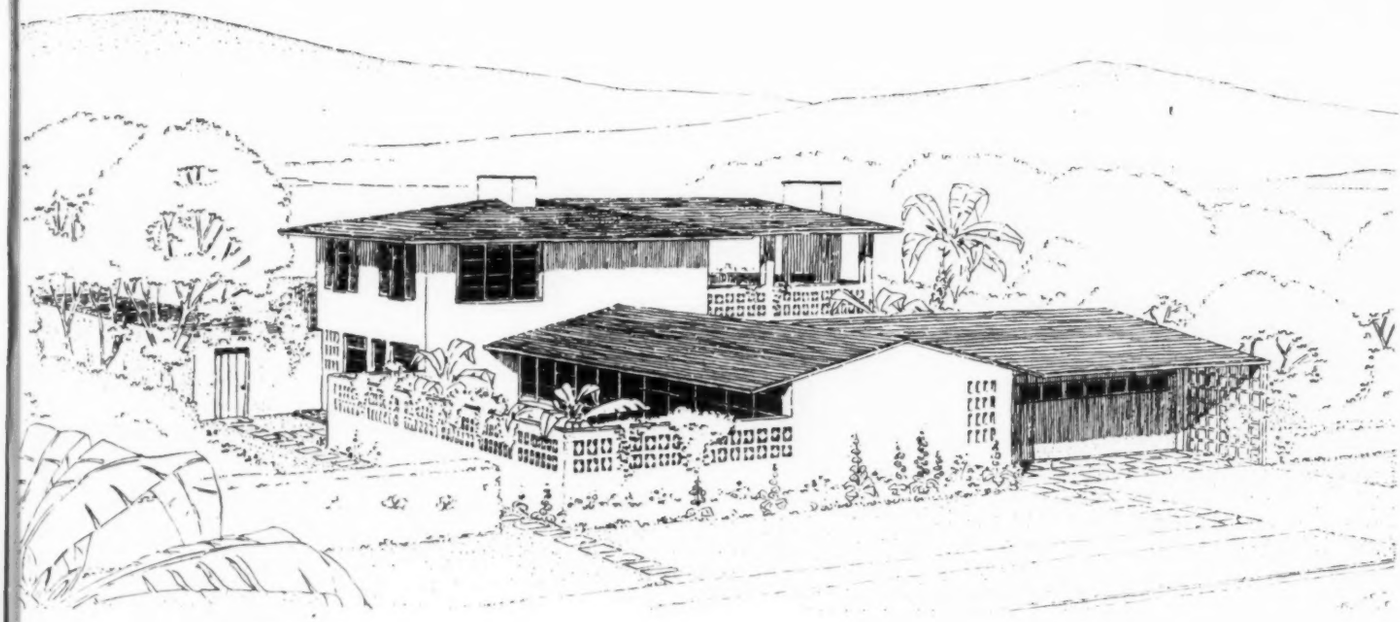
(*Continued on page 292*)

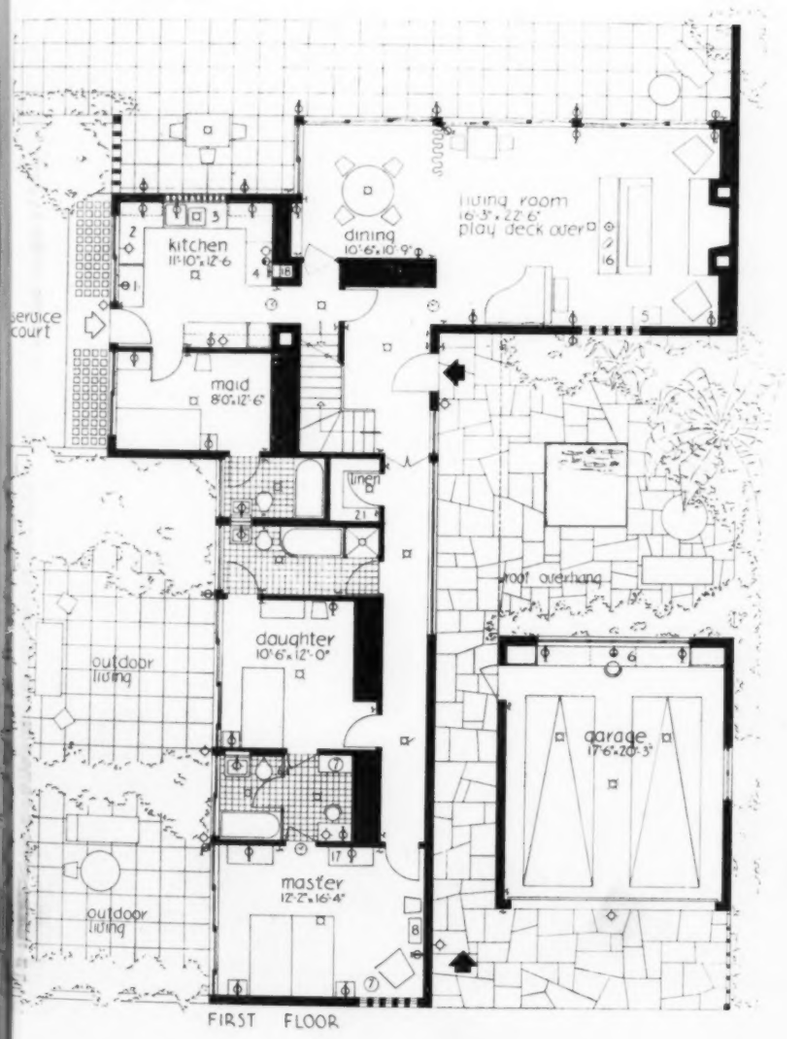


GRAND PRIZE
CLASSES A AND B

HAYS AND SIMPSON
ARCHITECTS—CLEVELAND





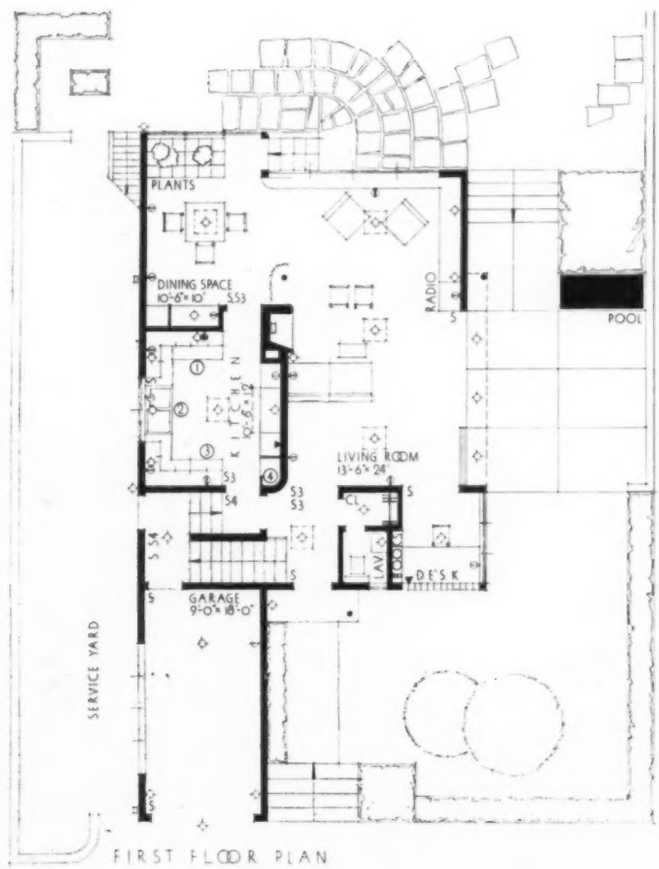


GRAND PRIZE
CLASSES C AND D

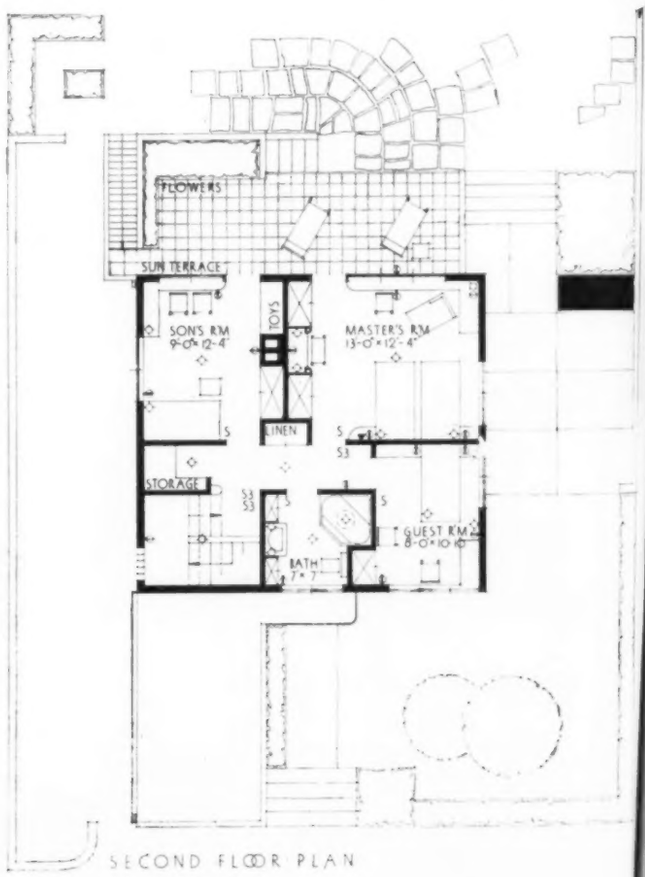
PAUL SCHWEIKHER
THEODORE W. LAMB
ARCHITECTS — CHICAGO

FIRST PRIZE — CLASS A

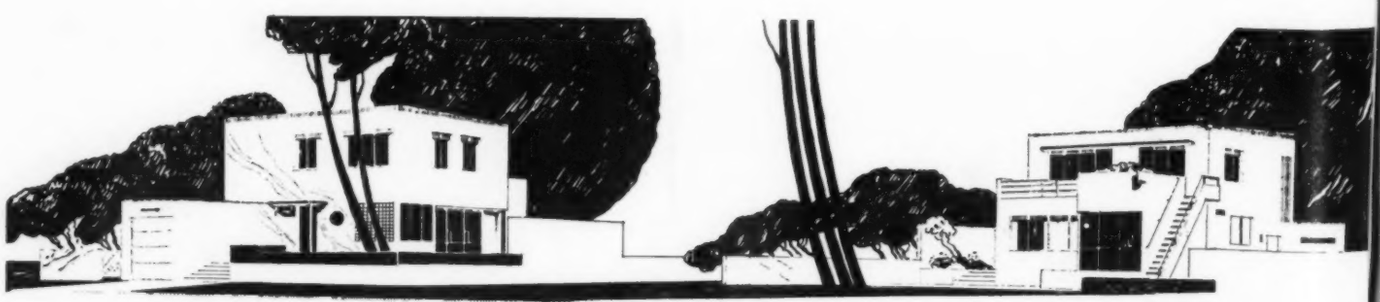
STEPHEN J. ALLING, ARCHITECT

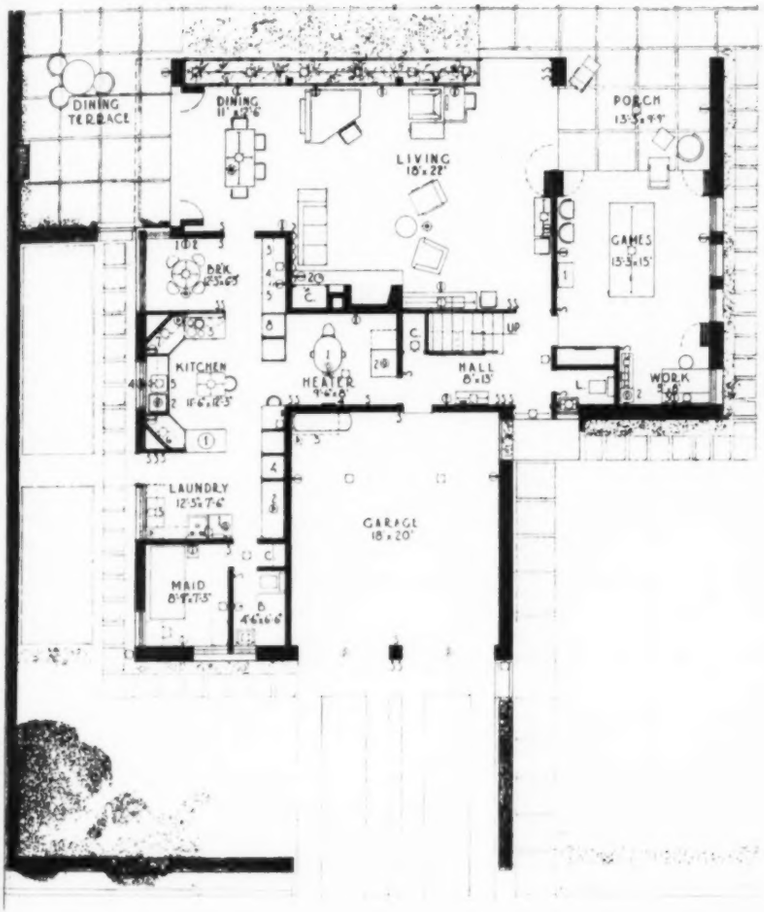


FIRST FLOOR PLAN



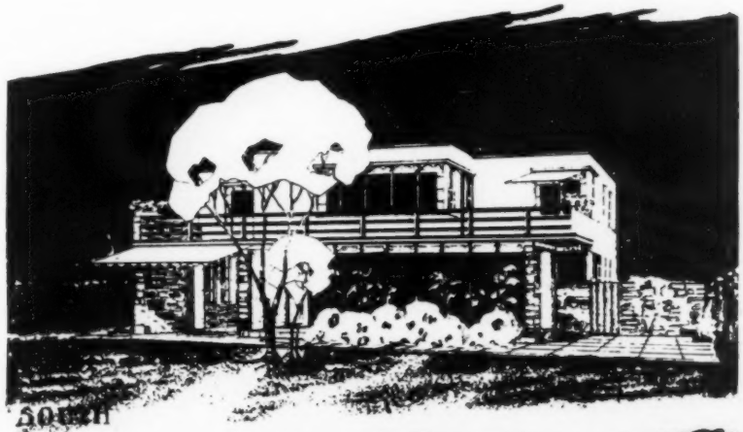
SECOND FLOOR PLAN



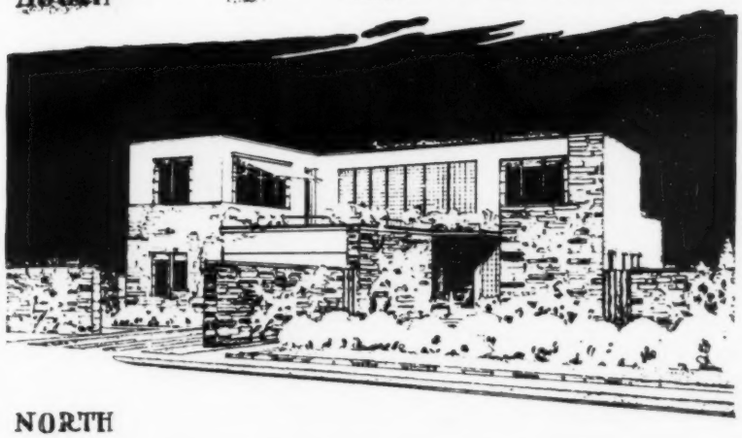


FIRST PRIZE — CLASS C

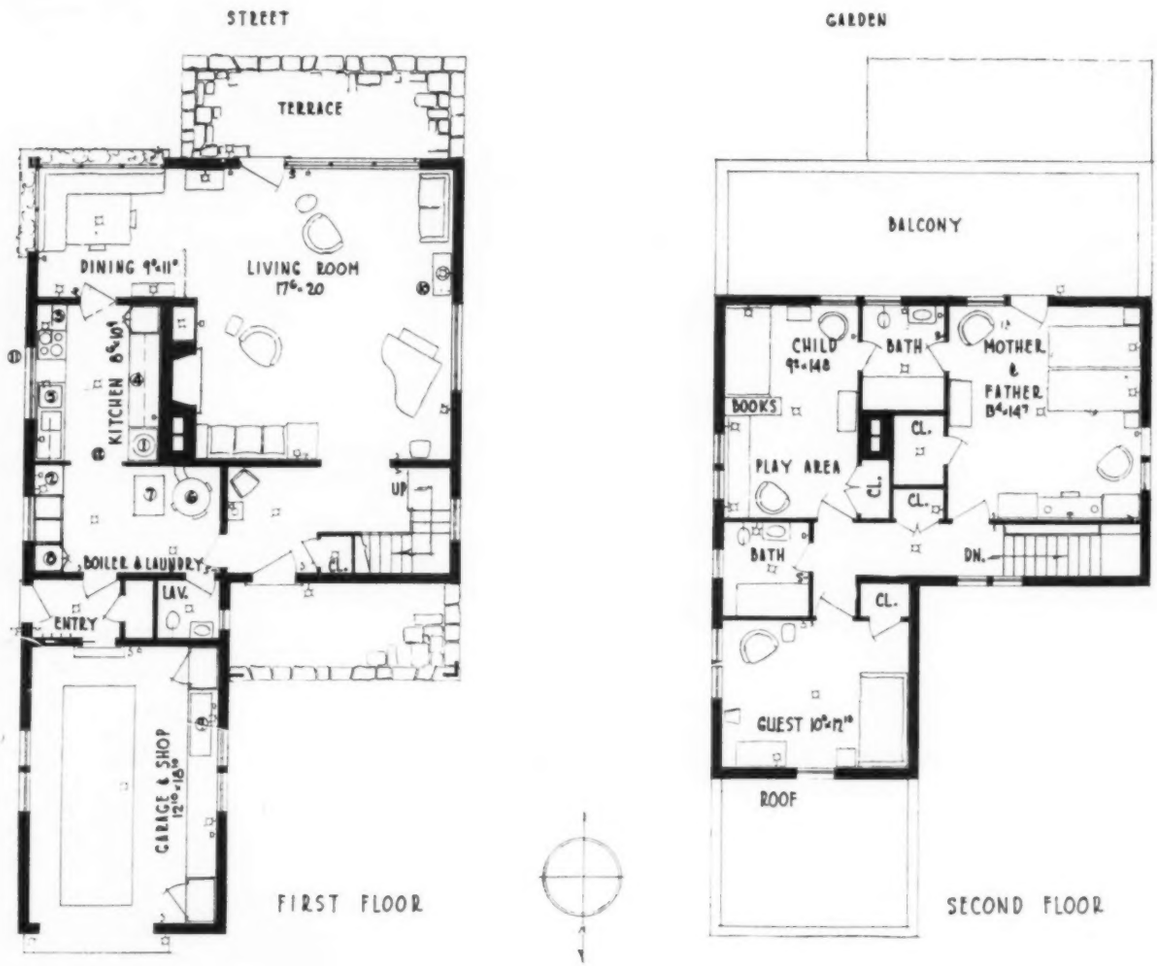
J. ANDRE FOUILHOUX AND DON E. HATCH, ARCHITECTS



SOUTH

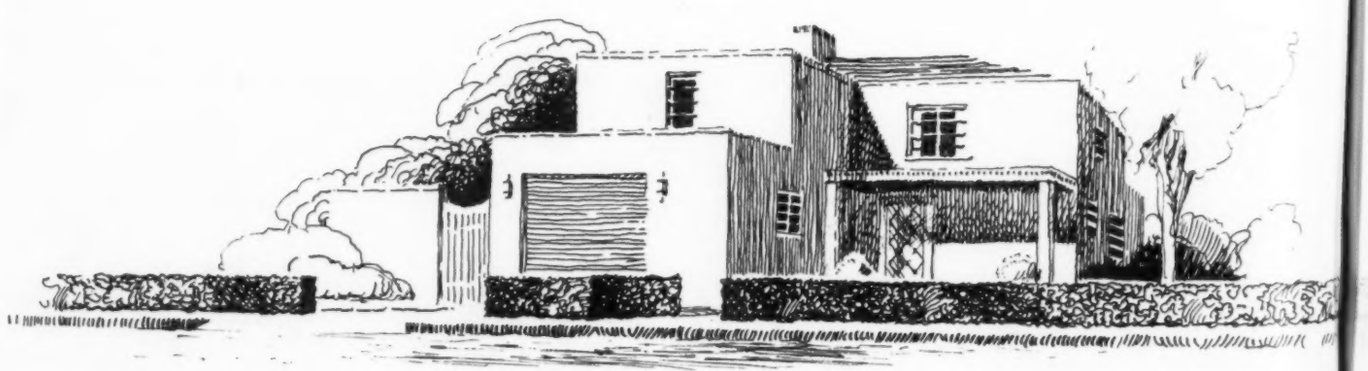


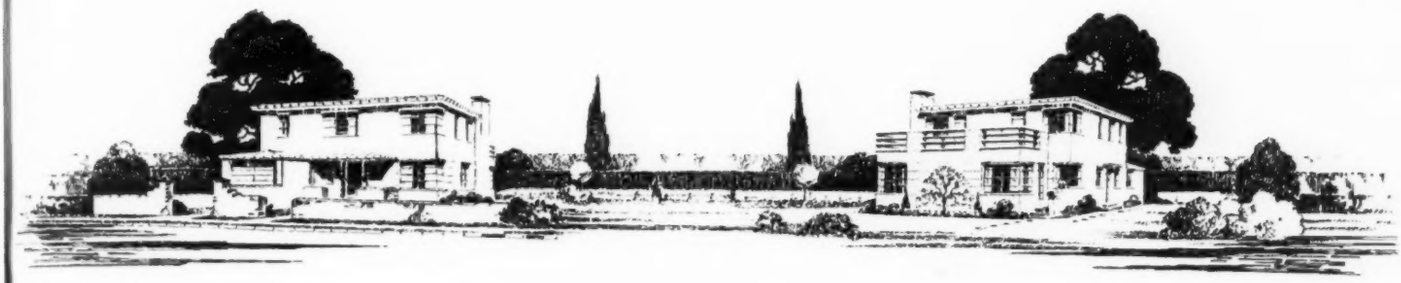
NORTH



SECOND PRIZE IN CLASS A

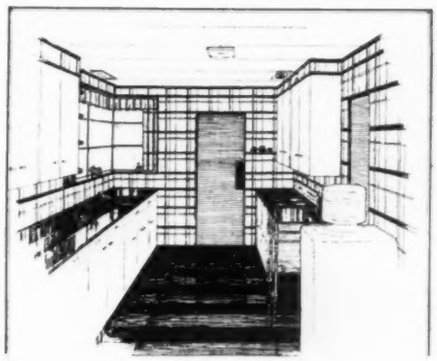
RALPH H. BURKHEAD
RICHARD C. HOYT AND
ANGELO MESSINA, ARCHITECTS



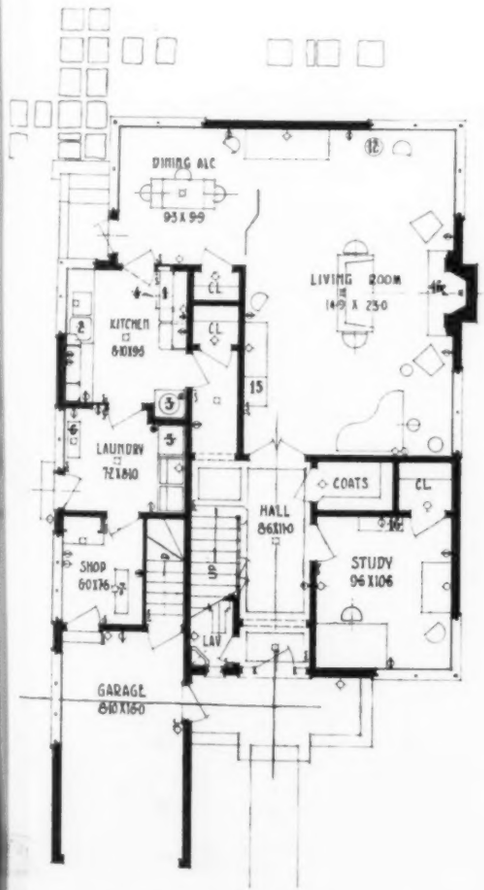


SECOND PRIZE — CLASS B

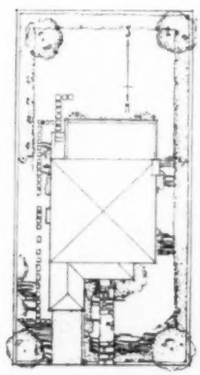
JOHN EKIN DINWIDDIE, ARCHITECT



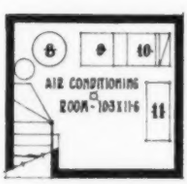
PERSPECTIVE OF KITCHEN



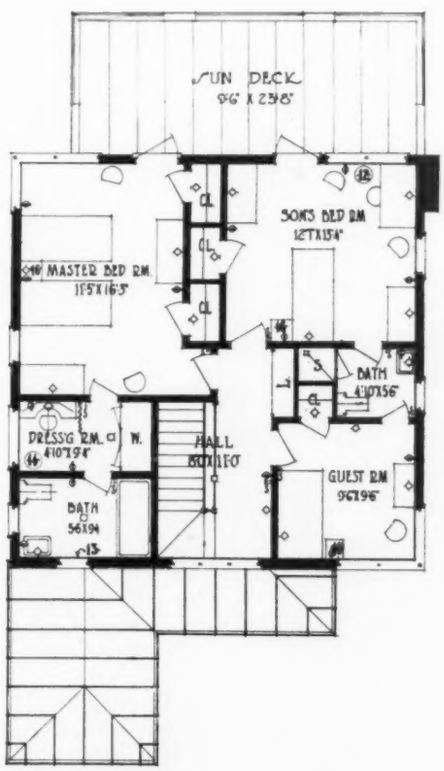
FIRST FLOOR PLAN



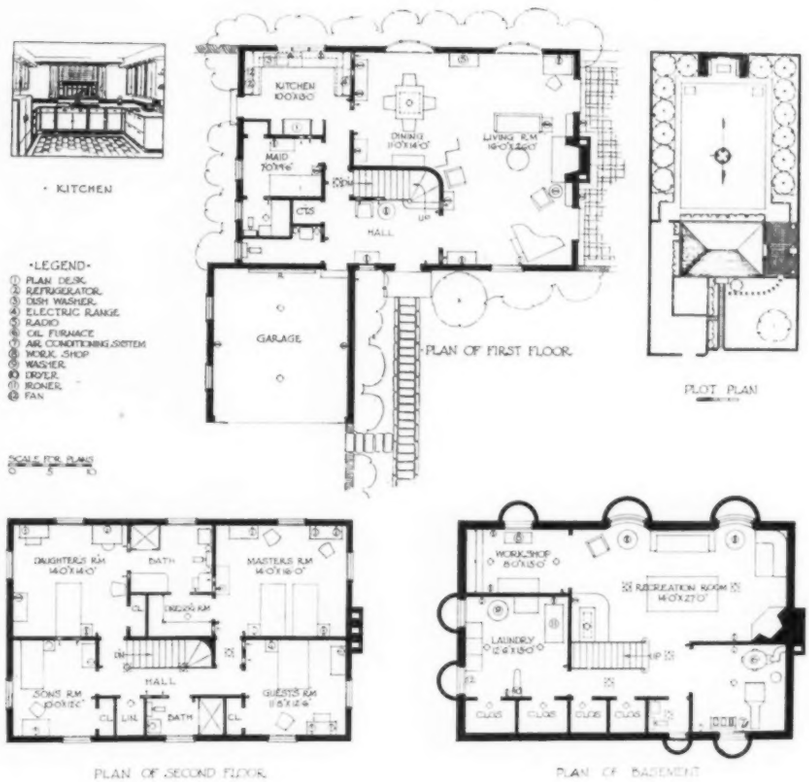
PLOT · PLAN



BASEMENT PLAN



SECOND FLOOR PLAN

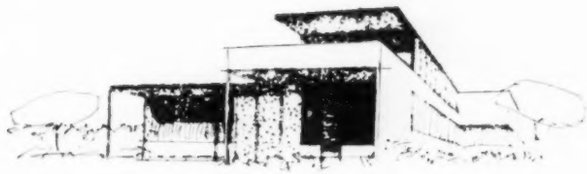


SECOND PRIZE IN CLASS C

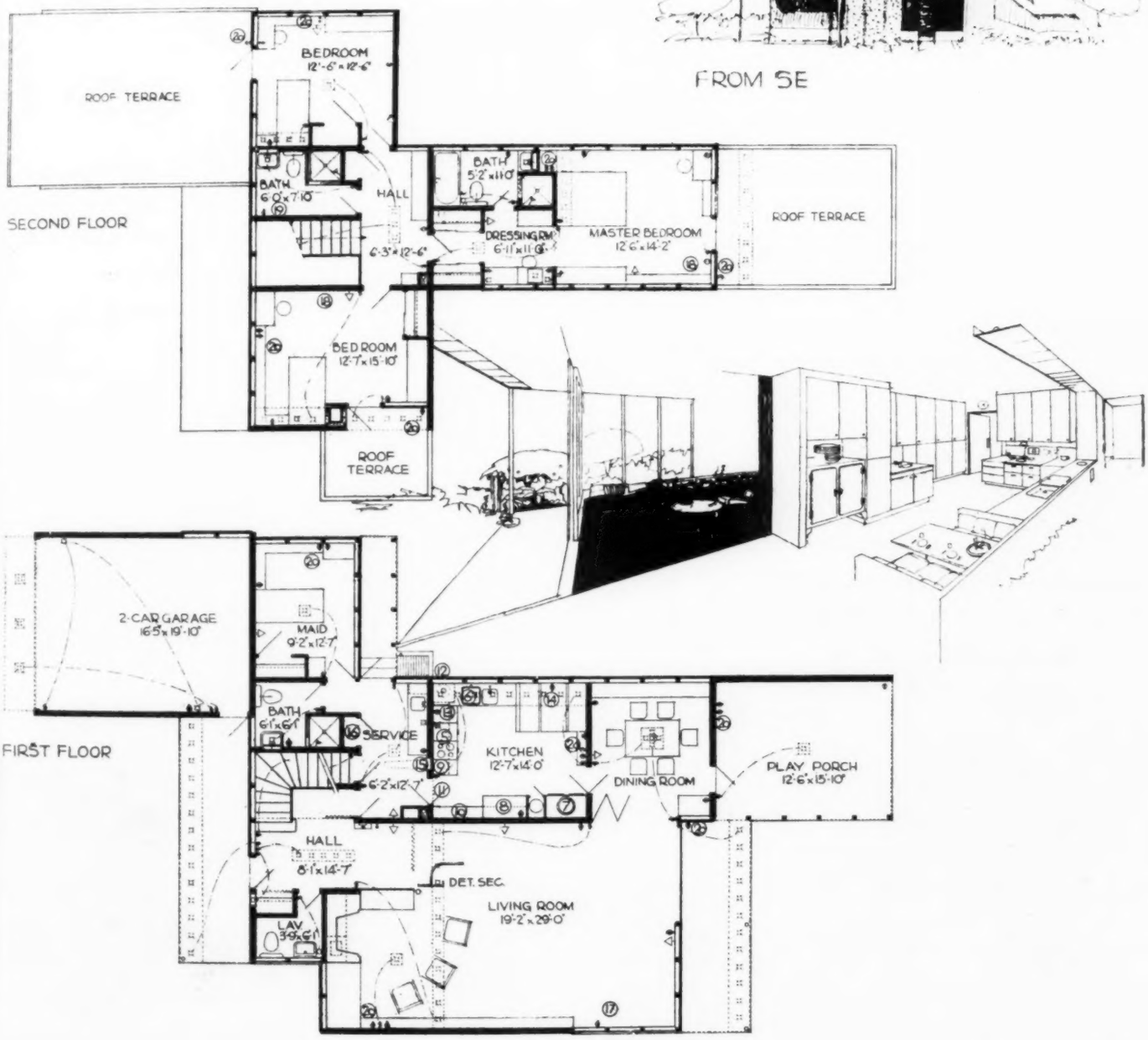
ARTHUR MARTINI
JONAS PENDLEBURG
ARCHITECTS

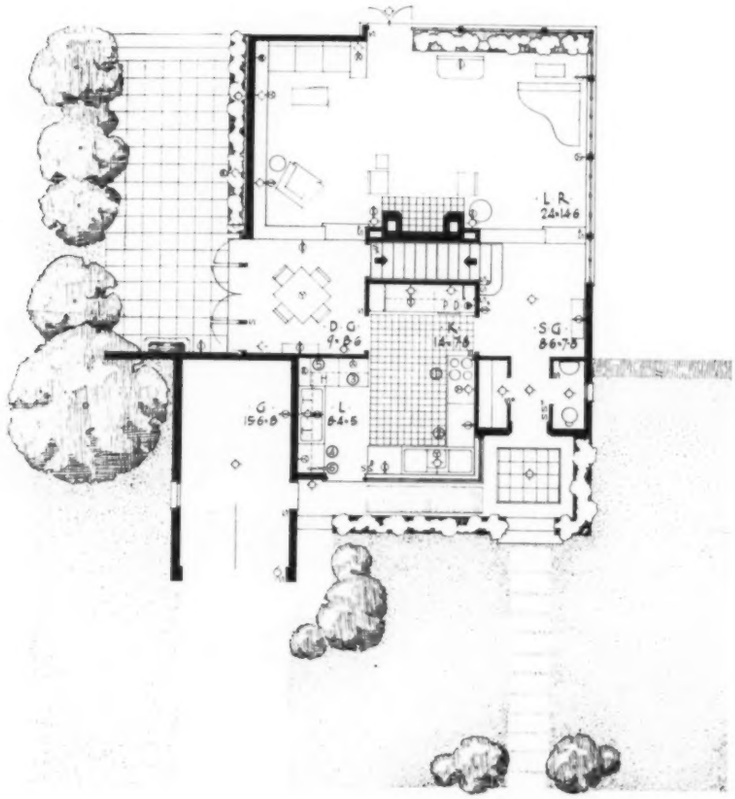
SECOND PRIZE — CLASS D

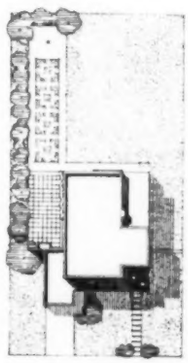
RICHARD J. NEUTRA, ARCHITECT



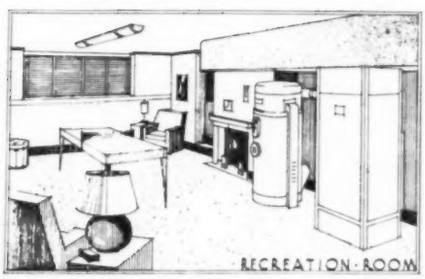
FROM SE







L.R.-LIVING ROOM
D.G.-DINING GALLERY
S.G.-STAIR GALLERY
K.-KITCHEN
L.-LAUNDRY
G.-GARAGE
REC.R.-RECREATION R.M.
STG.-STORAGE CLOSET
P.D.-PLAN DESK
H.-HAMPER
T.-WASH TUB
DUPLEX RECEPTACLE
RADIO OUTET

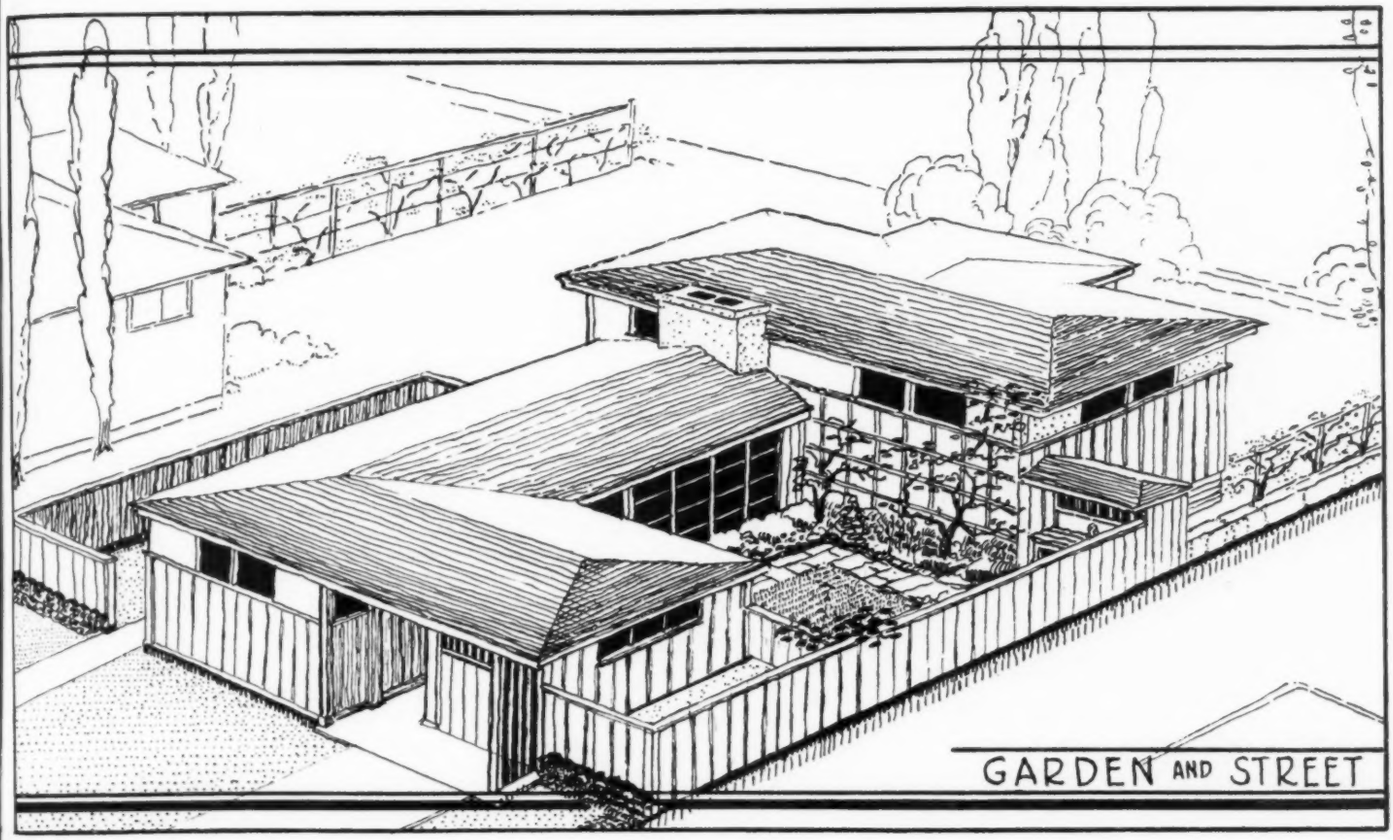


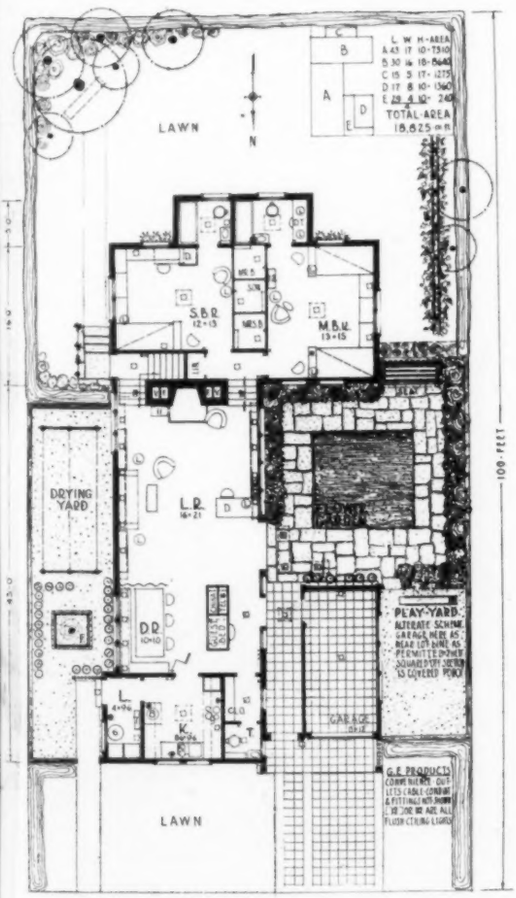
APPLIANCES

RANGE	KITCH BASE CABINETS
DISHWASHER & SINK	KITCH WALL CABINETS
REFRIGERATOR	PERSONAL RADIO
WASHING MACHINE	CONSOLE RADIO
FLAT PLATE IRONER PORT	VACUUM CLEANER
VENTILATING FAN	CLOCKS ALL ROOMS
OIL FURNACE	SUN LAMPS
AIR CONDITIONER	INFRO-RED LAMPS
LATHE COMBINATION	HOT POINT KITCH ACCESS

THIRD PRIZE IN CLASS A

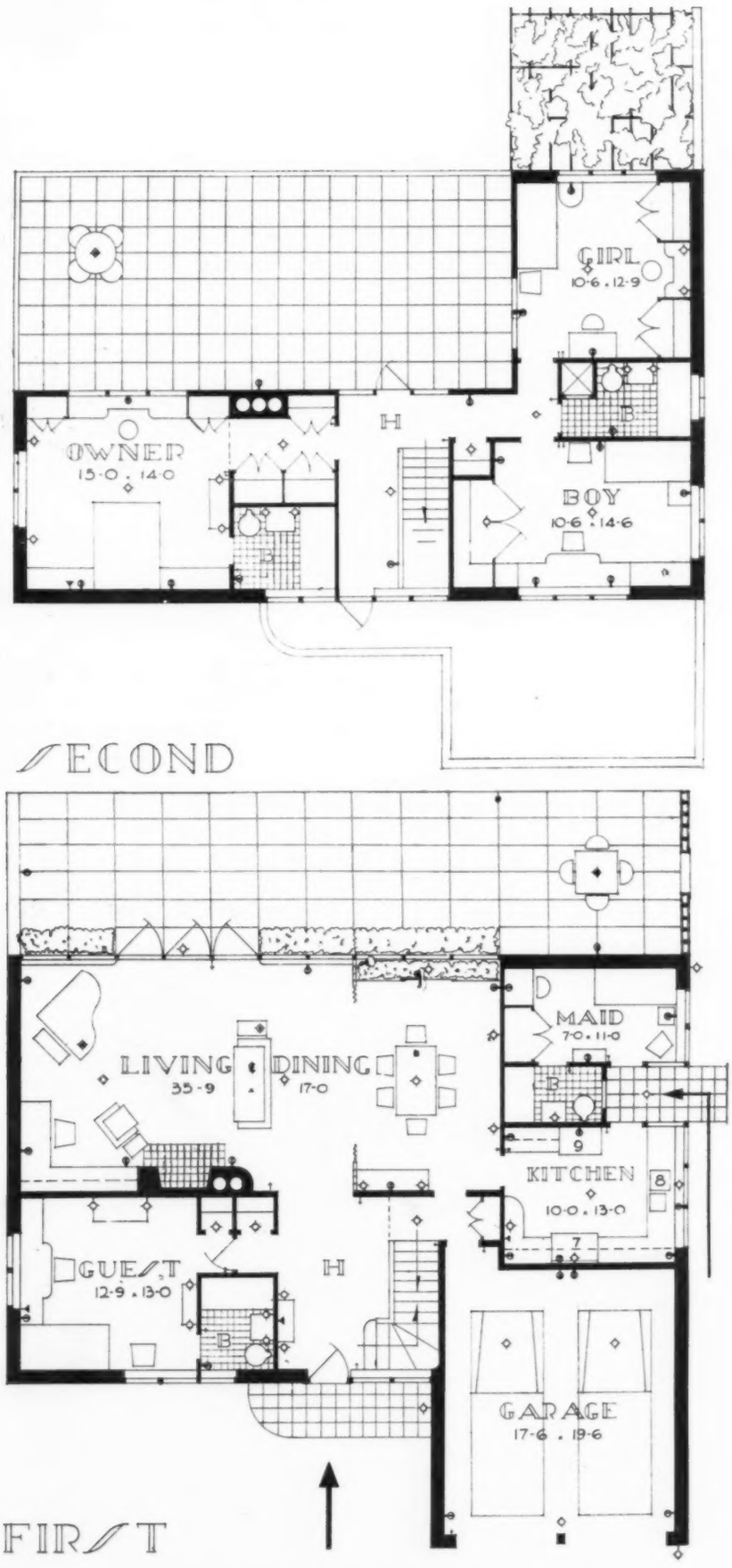
VERNER W. JOHNSON
PHIL BIRNBAUM
ARCHITECTS





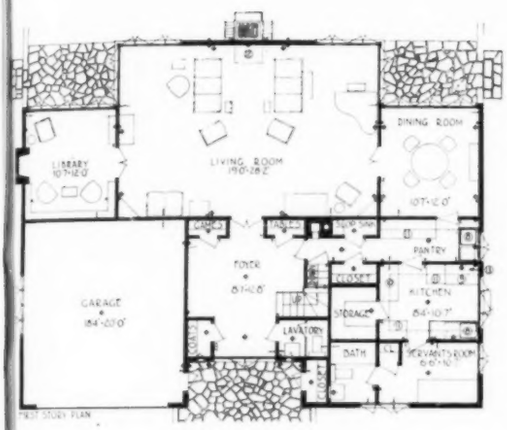
THIRD PRIZE — CLASS B

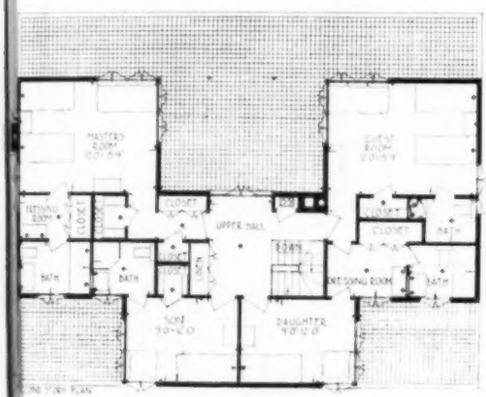
HERMAN A. L. BEHLEN, ARCHITECT



THIRD PRIZE
IN CLASS C

JOHN HIRONIMUS
ARCHITECT





THIRD PRIZE — CLASS D

JOHN DONALD TUTTLE, ARCHITECT

GENERAL ELECTRIC COMPETITION AWARDS

(*Continued from page 279*)

Forty who received honorable mention and checks for $100 each were Geoffry N. Lawford of New York; Jonas Pendlebury of Scarsdale, N. Y.; Kenneth Kassler of Princeton, N. J.; H. Lee Smith, of Toledo; Frederick M. Moss of Washington, D. C.; Paul Schweikher of Chicago; Roy E. Nelson of E. Cleveland; Phillip D. McFarland of Seattle, Wash.; Constantin A. Pertzoff of Boston; Walter H. Bruber of New York; R. Raymond Carter of Stillwater, Okla.; Phillip Sanfilippo of Brooklyn; Albert W. Ford of Long Beach, Calif.; Louis A. Thomas of Los Angeles; Arthur R. Hutchason of Los Angeles; Burton A. Bugbee of New Rochelle, N. Y.; J. R. Sproule of Seattle, Wash.; J. V. Wilson of Pittsburgh, Pa.; Stanley C. Reese of Chattanooga; J. D. Tuttle of New York; H. T. Lindeberg of New York; Melville Nauheim of New York; Charles F. Pope of Park Ridge, Ill.; Herman Frenzel of St. Paul; Byron E. Laidlaw of New York; W. E. Campbell and F. T. Hogg of Boston; A. R. Hutchason of Los Angeles; W. D. Lambdin of Baltimore; Howard A. Topp of Los Angeles; John D. Grisdale of Philadelphia; Harvey Stevenson of New York; George Palm, Jr., of Cleveland; W. K. Oltar Jevsky and N. T. Montgomery of New York; Jason S. Trespel of New York; Cecil Claire Briggs of New York, and Walter L. Moody of Los Angeles.

The Jury of Awards consisted of eleven members; seven architects representing the different sections of the United States; one expert in child training; one domestic science expert; one general contractor; and one realtor. Ralph T. Walker, of Voorhees, Gmelin and Walker, New York, was chairman; Kenneth K. Stowell, A.I.A., and former editor of Architectural Forum, was professional adviser; John F. Quinlan, of General Electric, was manager of the competition. Architects on the jury of awards were Franklin O. Adams, of Tampa, Fla.; Ernest A. Grunsfeld, Jr., of Chicago; Charles T. Ingham, of Pittsburgh; H. Roy Kelley, of Los Angeles; Charles W. Killam, of Cambridge, Mass.; and Eliel Saarinen, of Bloomfield Hills, Mich.

Other jury members were Katharine Fisher, Director of Good Housekeeping Institute; Harold D. Hynds, engineer of New York City; Dr. Grace Langdon, child training expert and Director of Educational Advisory Service, New York; Hugh Potter, realtor of Houston, Texas, and president of the National Association of Real Estate Boards; and Henry F. Richardson, engineer, of New York City.

Fully 75 per cent of the plans depicted the flat roof, modern type of house, somewhat as displayed at the Century of Progress in Chicago. Many designs placed the garage at the front of the house with the kitchen adjoining, and the living room across the rear, facing the yard and garden. All plans gave particular attention to the layout of the yard with its shrubbery and flowers.

Greater utilization of the cellar or basement, now commonly used for the furnace and perhaps the laundry, was also brought out in the many designs. This space is used for a recreation or play room for children. This is made possible by the use of automatic heat, such as supplied by the oil or gas furnace. The drawings showed that time-saving, step-saving, and labor-saving had been the rule in the studies of the architects.

PAINT—A PARTNER IN ILLUMINATION

By **RALPH BENNETT** and **T. J. MALONEY**

OFFICE OF NATHAN HORWITT, HEAD OF DESIGN ENGINEERS, INC., NEW YORK CITY

Rotan

SIX FACTORS IN GOOD SEEING

(1) *General illumination* sufficient to overcome sharp contrasts with light sources and to afford eye comfort. The degree of illumination should give consideration to room functions.

(2) *Supplementary light sources* for special tasks where general illumination is inadequate—as for reading or other close visual tasks. Sufficient intensity of light, with suitable diffusion, to afford abundant illumination without glare.

(3) *Complete absence of glare* from direct sunlight, exposed or inadequately diffused artificial light, or reflection of light from polished surfaces and mirrors, and from bright light against dark backgrounds.

(4) *Utilization of reflecting surfaces*—walls, ceilings or reflectors—that do not absorb appreciable amounts of light, and are sufficiently matte or textured to scatter or diffuse light.

(5) *Daylight quality*—white light. Reflecting surfaces for artificial illumination favoring white or blue-white to minimize the fatiguing yellow of tungsten lamps. Opal glass diffusers or blued filter lenses are sometimes recommended.

(6) *Intensity of light* varying according to the object to be seen. Dark surfaces, reflecting less light, require more light to be seen. Light useful in seeing is that reflected from an object and not that falling upon it.

TANGIBLE RESULTS OF PROPER ILLUMINATION

(1) Elimination of eye strain.
(2) Elimination of fatigue and nervous tension.
(3) Reduction of accident rate.
(4) Improved morale.
(5) Increased efficiency of personnel.

Rotan

FACTORS IN GOOD SEEING

From the standpoint of adequate and suitable illumination, and the relationship between primary and secondary light sources—that is, between daylight or artificial light and reflecting surfaces of the right finish and a suitable color—paint becomes a salient factor. The decorative and psychological aspects of illumination calling for a specialized use of color are augmented by an increasing demand for radically improved seeing conditions—which is a threefold problem involving:

(1) The utilization and control of daylight from windows.

(2) The utilization and control of artificial lighting.

(3) The utilization of secondary sources—walls and ceilings with high reflection coefficients, to refine and distribute light.

MEASUREMENTS OF LIGHT

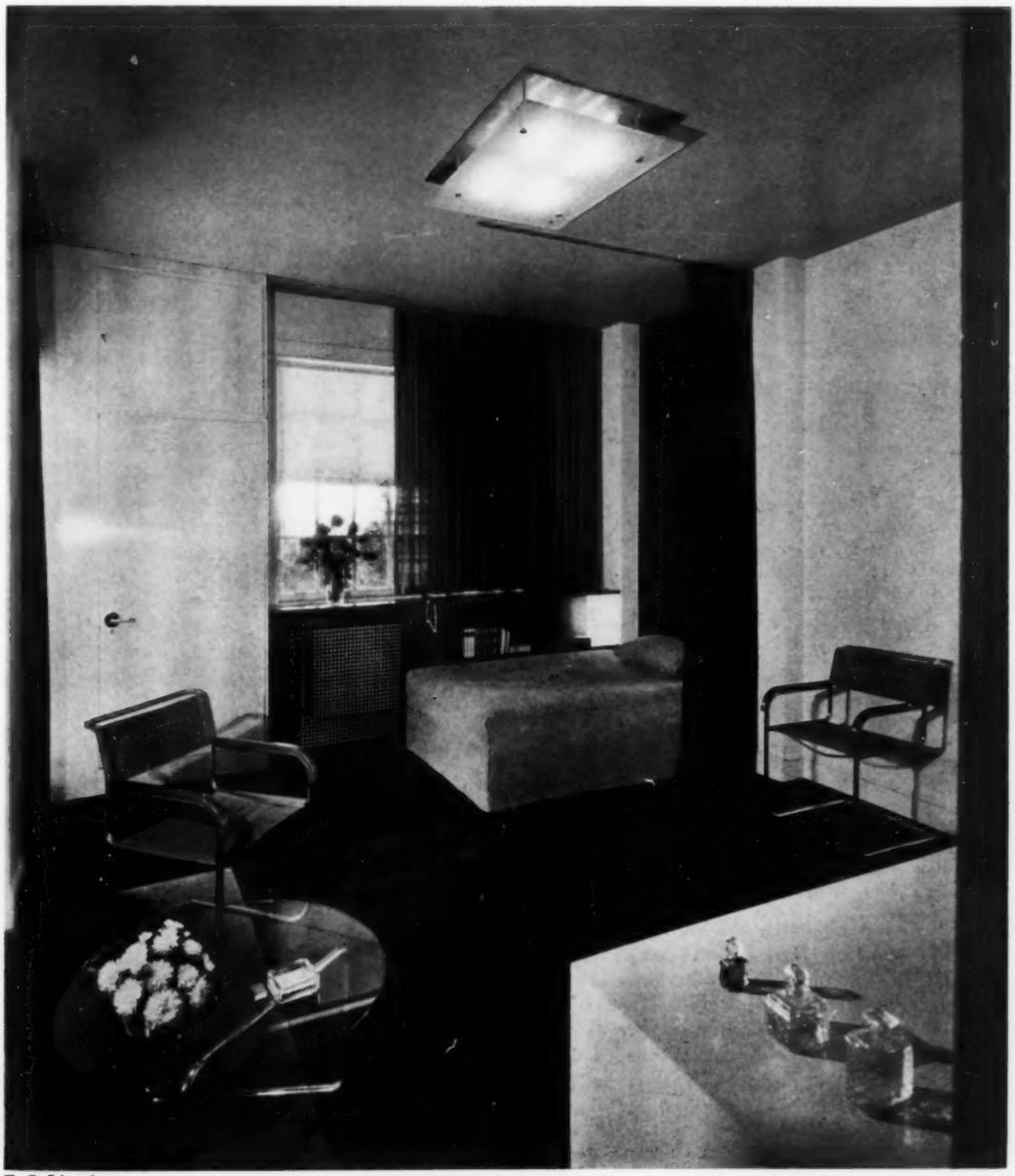
In utilizing and controlling light, we are aided in determinations of light intensity and quality by several contributions of science.

The *foot-candle or sight meter,* an instrument which enables us to measure, on a given plane, the quantity of direct light or light reflected by painted surfaces.

The *photo-electric recording spectro-photometer,* developed by Professor Hardy of M. I. T. This instrument measures the physical properties of a material which when illuminated gives rise to a sensation of color. It also measures the relative amounts of all wave lengths of light reflected from variously colored surfaces.

Finally, the *photometer and reflectometer,* which measures the reflection values of surfaces under different light sources and painted with different colors.

Left: Office of Nathan Horwitt, head of Design Engineers, Inc., New York City. Ceiling and upper walls are painted white for light reflection.



Right: Apartment of P. Immo Gulden, New York City, designed by William Muschenheim, architect. Color scheme: gray ceiling; white walls; blue radiator inclosure; dark blue curtains; black, blue and gray carpet.

F. S. Lincoln

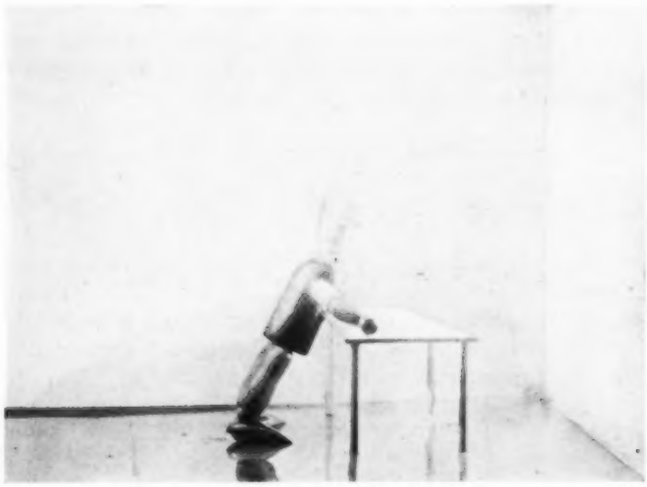


Figure 1

Figure 2

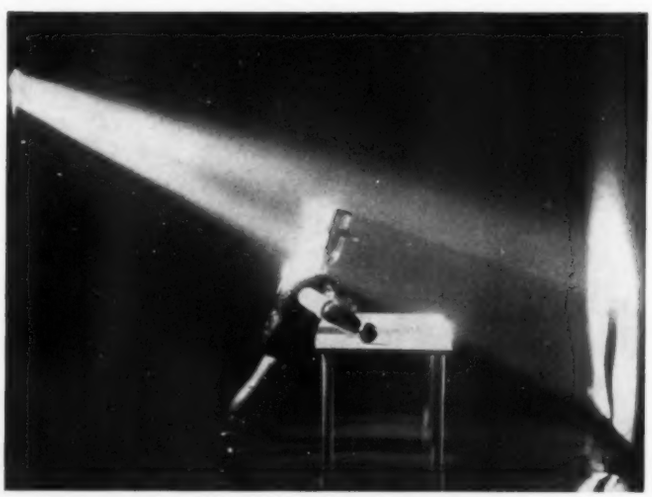


Figure 3

Figures 1, 2 and 3 illustrate the relationship between light sources and reflecting surfaces. Where good seeing is the objective, complete diffusion of light over the working plane is essential. In attempting to give depth or character to a design too much diffusing light may have a flattening effect. (Fig. 1) White paint on walls and ceiling affords a high degree of reflection and diffusion of light. (Fig. 2) Metallic paint, because of its lower reflection value, diffuses less light, resulting in sharper contrasts and shadows. (Fig. 3) The identical room painted black results in a searchlight effect and glare from the light source against the dark background.

PAINT A PARTNER IN ILLUMINATION

The relationship between light sources and reflecting surfaces is very close. One aspect of it can be shown graphically by three miniature rooms constructed and photographed in the laboratories of the Sherwin-Williams Co. In each case the light source was identical, and the conditions were the same save for the color of paint applied.

Fig. 1: The interior was painted white. The resulting high degree of reflection and diffusion or scattering of light eliminates all glare spots and shadows, and the luminous flux or brightness is high for all parts of the room.

Fig. 2: Metallic paint was applied. Owing to greater specular reflection, there is a drop in luminous flux. Glare spots appear. The source of light becomes more apparent, and a shadow is cast from the robot.

Fig. 3: The same room painted black. The light absorbing and low reflecting powers of black reduce the luminous flux to a minimum for the light source used. A searchlight effect results, and glare from the contrast of light and dark, together with the shadows cast from the robot combine to afford a virtually impossible seeing condition.

CONTROLLING ELEMENTS

Given a suitable light source, it is apparent:

(1) The quantity of good, usable light is directly proportional to the reflection values of surrounding surfaces.

(2) The quality of illumination is dependent upon the nature of the reflecting surfaces and the color.

REFLECTION VALUES OF PAINT

Considering the above two factors in order: The reflection values of paint colors become a prime consideration in developing color schemes in any room where good visibility is important. A balance between high and low reflecting paints must be established where color is to play a decorative rôle, and preference should be given to paints with high coefficients of reflection for upper walls and ceilings.

The reflection values for different colors in paint, based upon a comparison with magnesium oxide (not a paint pigment) as the standard of reflection at 98 per cent, are:

The following table* shows paint colors and the amount of light they reflect:

White	84%
Cream	70.4
Light Pink	69.4
Ivory	64.3
Yellow	60.5
Flesh	56.
Buff	55.4
Light Green	54.1
Light Gray	53.6
Light Blue	45.5
Sage Green	41.
Aluminum Gray	41.9
Brown	23.6
Dark Red	14.4
Dark Green	9.8
Dark Blue	9.3
Black	10.

*Readings made by the Munsell Color Co., Inc., for the New Jersey Zinc Co.

MEASUREMENT OF QUALITY

By means of a foot-candle or sight meter we can obtain a direct reading of actual light values in any part of a room, as effected by the color of paint on wall and ceiling surfaces. The unit of measurement is the foot-candle—defined as the amount of light resulting from a candle flame one foot in any direction from the light source. An average of one foot-candle of light on a surface one foot square constitutes one lumen, and is referred to as the luminous flux.

Figures 4, 5, and 6 are identical miniature rooms designed to illustrate the increase in luminous flux in terms of foot-candles where the light source remains constant and room surfaces alone differ. Figure 4 represents an unpainted room, and only one foot-candle is recorded by the sight meter. Figure 5 is a poorly painted room, and dirt has reduced the reflection value of the paint; a reading of but 4 foot-candles results. Figure 6 is painted with a white paint having a high coefficient of reflection; the foot-candle meter jumps to 22½. In the industrial field practical determinations in the reduction of lighting costs and improvement in the intensity or quantity of light have been made by similar tests and with overwhelming evidence in favor of paints with high reflection values.

A range up to 22½ foot-candles of light from an artificial source is normally ample for most seeing conditions.

General illumination should range from 4 to 12 foot-candles, according to conditions or effect desired. The lower levels are favored for corridors, lounge rooms, auditoriums, hospital lobbies, hotel dining rooms, etc.; higher levels for kitchens, reading and writing rooms. Close work in offices, prolonged and more difficult reading and other special visual tasks require 18 to 30 foot-candles. Inasmuch as the eyes see by reflected light and not by light falling upon an object, darker objects require higher light intensities to give clear definition. With higher intensities of artificial lighting it becomes increasingly important to shield the light source and thoroughly diffuse the light.

Inasmuch as the eyes see an object by light reflected from it and not by the light falling upon it, the foot-candle meter should be made to read higher where dark objects are to be seen. Clear definition requires increased illumination.

QUALITY OF LIGHT

The second important consideration—quality of light—involves:

(1) Types of reflection from surfaces—specular, spread, and diffuse.

(2) Color, in obtaining artistically or psychologically desirable effects or suitable illumination.

TYPES OF REFLECTION

Specular reflection results from light rays striking a high gloss paint, or from polished metal surfaces, glass top desks, and mirrors. This type of reflection causes annoying glare if in the field of vision, and should be avoided from the standpoint of good seeing. Gloss paint applied to a finely textured surface tends toward spread or diffuse reflection, and is therefore less glaring.

If the light source is of the concealed type and provided with a diffusing glass or, where exposed,

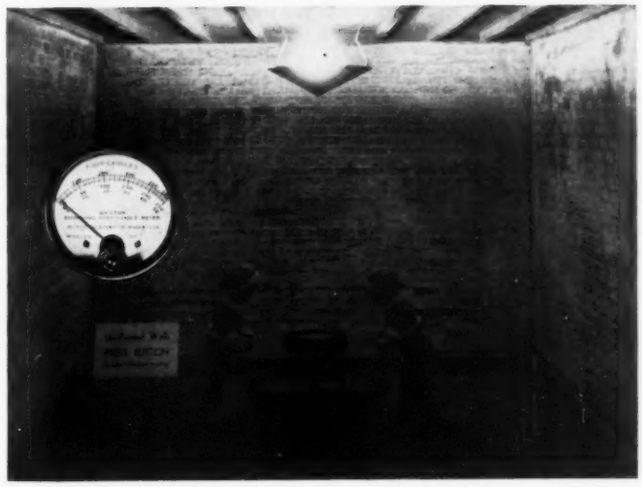


Figure 4

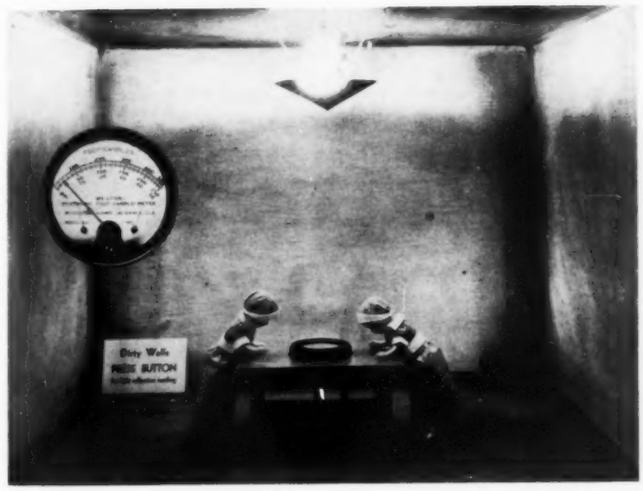
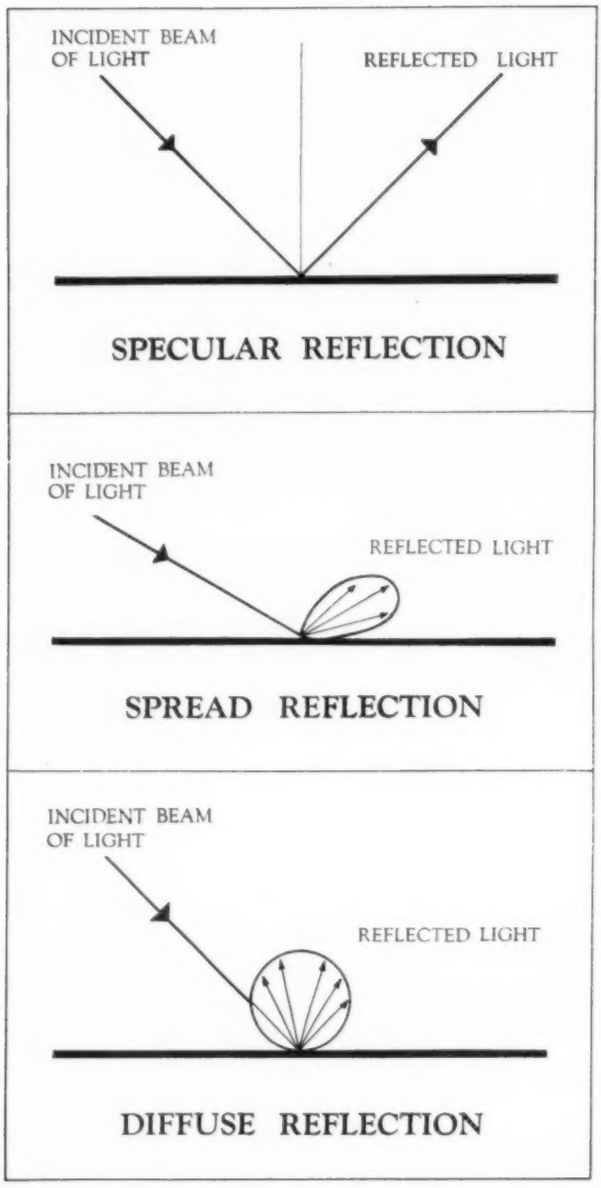


Figure 5

Figure 6

Figures 4, 5 and 6 show the relative reflection values of white painted surfaces and other finishes. Three miniature rooms, identical except for the wall and ceiling surfaces, were given a Sight-Meter test by the Sherwin-Williams Company laboratory. Figure 4 is an unpainted brick wall. The Sight-Meter registered only one foot-candle. In Figure 5 the room is painted, but dirty and dingy. The Sight-Meter showed but 4 foot-candles. In Figure 6 the room was painted white. The foot-candle meter jumped to 22½, though the light source remained the same.



Adapted from diagrams in LIGHT AND WORK, by M. Luckiesh

provided with a sufficiently large opal or other type of diffusing globe, serious annoyance from gloss finishes will be overcome. However, there are types of slightly diffusing gloss paints and semi-gloss paints that combine dirt resistance, washability and diffusing qualities. These should be used wherever flat paints are not suitable.

Spread reflection is the type usually resulting from spun metallic surfaces and metallic paints. The ray of incident light striking the many polished edges or particles is reflected in one general direction but not in an exact line as in the case of specular reflection. This type of reflection is not especially annoying except where the light source is of high intensity and the reflection is cast in the field of vision. This may be controlled by suitable placement of artificial light sources, but the problem becomes more complicated with respect to daylight.

Diffuse reflection is by far the most desirable type from the standpoint of good seeing. Matte or flat and textured surfaces break up light rays, scattering them in different cross directions instead of in parallel or radiating lines. The resulting diffusion avoids harsh glare spots and shadows, and gives a more even distribution of light.

Complete diffusion would require a perfect reflecting surface of a diffusing type. For offices, stores, schools, and practically every type of industrial work, the degree of diffusion afforded by white or light colored ceilings and upper walls is a distinct asset in increasing the efficiency of individuals and in reducing eye fatigue. Objects or areas upon which the eye will be focused over a period of time should always be painted colors sufficiently off white to be restful, however.

Too complete a diffusion of light, especially where indirect luminaries are used against a low relief design on a ceiling sometimes results in a flattening effect undesirable from an architectural standpoint. Where the desire is to give accent or form to architectural details, it may be advantageous to adopt cornice or other types of lights obscured from the field of vision and of sufficient intensity to give depth. The lighter painted area can be planned to direct the greatest volume of light to the decorative objects or areas. Different shades of color may also be used effectively in giving accent or depth to relief designs.

RELATION TO INDIRECT ILLUMINATION

Frequently, as in offices and department stores and the like, the principal objective is to obtain abundant diffused light over the floor areas and to hold peoples' attention there.

Figures 7 and 8 illustrate by contrast how this may be effectively accomplished by substituting indirect luminaries placed above the eye level behind counters and on center cabinets. Stippled, convex glass cover plates placed over the light sources eliminate ceiling striations. The ceiling illustrated is painted white, the columns buff, and the floor a gray marble. Indirect illumination is dependent entirely upon the reflection values of white or light tints of paints on the upper walls and ceiling.

The distinct advantages in a department store resulting from the adoption of indirect illumination, supplemented by white paint, are:

(1) Customers' attention is taken from the ceiling lights and directed to the well-lighted counters displaying merchandise.

(2) The brighter interior has the psychological effect of creating a cheerful state of mind conducive of increased buying.

(3) Better illumination is obtained without added lighting load.

(4) A more inviting atmosphere results from the improved appearance.

In schoolrooms, the abundant diffusion of light has been proven to increase the alertness of pupils, and definitely to increase the number eligible for promotion, making it a particularly important consideration and a real economy.

FUNCTIONS OF COLOR

"In the visible spectrum, one of the most striking phenomena is that of selective absorption, together with its concomitant phenomena of selective reflection and

Photographs courtesy Nela Park Engineering Dept., General Electric Co.

7 8

Figures 7 and 8 illustrate a practical demonstration of the relationship of paint and light. Indirect and semi-indirect illumination are especially dependent upon the light reflection values of white paint. Figure 7 shows the Gimbel Department Store before adopting indirect illumination supplemented by white painted ceilings. Figure 8 shows the same floor area using indirect luminaries placed above eye level behind counters.

selective transmission. To these are due all color effects in opaque and translucent bodies."*

Our present knowledge of colors, combinations and effects, opens up vast possibilities for their use to good advantage and with consideration to daylight and artificial illumination.

Any treatment of illumination or decoration must give consideration to the emotional qualities and decorative aspects of colors as well as reflection values. This can be accomplished without serious sacrifice of any one desirable quality. Generally speaking, lower levels of illumination and colors of a more subdued, neutral or restful sort should be used in lounge rooms, lobbies, theaters and other places designed for relaxation. Brighter illumination and more stimulating colors should naturally be favored where the objective is to inspire activity or an active state of mind.

This selection of suitable colors is of extreme importance. In hospitals, convalescence may be speeded by the emotional state created by one color scheme, or retarded by another. Ceilings are of especial importance. In the operating room where eyes are strained, white is considered objectionable; straw color or soft greens are usually recommended.

In offices, in stores, schools, hotel lobbies, and certain types of dining rooms where the aim is to create animation, brighter colors and illumination are of definite value.

CONSIDERATIONS

Inasmuch as the emotional responses usually associated with given colors may be radically altered in particular applications, consideration must be given to:

(1) The color scheme or treatment.
(2) The design employed.
(3) The light source.

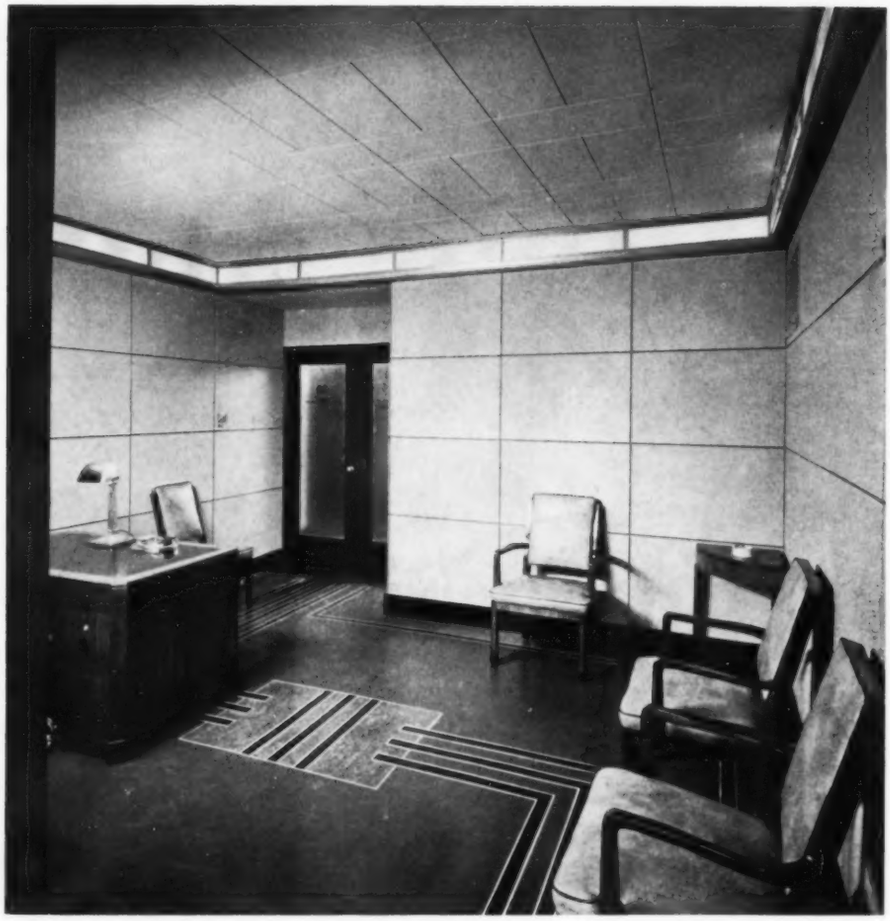
Black, usually classified as depressing and heavy, may assume life and snap with but slight relief from bright colors or designs that lend motion. Brilliant or subdued illumination will also alter the atmosphere considerably, irrespective of other factors.

LIGHT AND COLOR

In specifying colors consideration must always be given to the type of artificial light to be used and to the effect of both day and artificial light on the shade of color. Certain shades of blue and green become almost indistinguishable under the tungsten illumination. Reds, oranges, yellows, and browns tend to become richer. Blue becomes darker under artificial lighting, and appreciably brighter and a really pure color under daylight. Fabric colors are especially susceptible to the color values of different light sources, and may effect the entire color scheme. Colors for a room should therefore be picked with respect to day or night occupancy, or the effect of either type of light on the colors for day and night.

If a colored surface is flooded with intense light as from spotlights or indirect luminaries, a paling or flattening effect will be produced. This condition can be avoided by directing the light against white or tinted surfaces, or by diffusing the light at the source by means of opal or other types of diffusing glass.

*"Modern Lighting"—Radiation & Color by Caldwell.



Reception room of the Johns-Manville Corporation, New York City, designed by Shreve, Lamb and Harmon, architects. Acoustic tile ceiling finished in baked enamel for light reflection.

COLOR AND LIGHT

The use of reflectors or shades that favor a white or blue-white reflecting surface will facilitate simulating daylight quality.

When indirect or semi-indirect illumination is to be used and the light intensity must be sufficient for good seeing conditions, white or light tints should predominate the color scheme—especially on upper walls and ceilings. Daylight received from limited window sources is also dependent upon paint surfaces of high reflection values.

Perhaps it is because of long association with the fireplace, and the warm red-yellow of candle flames that the natural yellow of tungsten lamps is so accepted and the natural yellow is often increased by the use of yellow, brown, or red shades or painted reflecting areas. From the standpoint of seeing, especially for reading, or performing other close visual tasks the light resulting from lamps so treated is both harmful and fatiguing to the eyes.

In this respect we may expect to find increased attention being paid to the quality of light from artificial sources, and reflected from paint surfaces—for paint surfaces reflect their own color predominantly. Artificial daylighting on a large scale is not entirely practical from the standpoint of initial and operating cost. The only really satisfactory daylight quality obtained by artificial methods at the present time is by using lenses over tungsten lamps which whiten the light by selective transmission. These should be of the power of Corning and Macbeth lenses to produce a light quality closely simulating daylight.

BALANCE IN COLORS

Balance between areas giving light reflection and those lending color is important. The proportion of each must be governed to suit the mood of the occupant and with respect to activities in a particular room.

"STREAMLINED" COLORS

A particularly successful treatment of color in relation to light is the color scheme recently developed in the color studios of The Sherwin-Williams Co. and being carried out in the new streamlined trains of the New York, New Haven & Hartford Railroad. Indirect illumination is used. The ceiling proper of the car and the sloping cornices are painted white or just off white to reflect as much of the light as possible, downward and over the chairs. A very soft pastel shade of the color selected for the car is then carried from the cornice to the window heads. This very light shade overcomes the absorption of the light by upper areas and avoids the flat effect common to dark colors receiving strong illumination.

Windows are brought together by a color band of a deeper, restful, and lower reflecting shade of the theme color. Frames and mullions are painted the same color. Below the sills, the pure color selected is applied, which gives strength and definiteness. The chairs and floors are done in harmonizing shades. The use of pastel shades on upper portions gives brightness and cheerfulness, and the color innovation marks a happy departure from the drab and depressing interiors so frequently associated with railway cars.

NEWS OF THE FIELD

Sturgis Associates, Inc., and William Stanley Parker, architects, announce that Mr. Parker has retired from the Corporation. Sturgis Associates, Inc., and Mr. Parker will continue, independently, the practice of architecture at their previous offices at 120 Boylston Street, Boston.

Allmendinger & Schlendorf, architects, announce the removal of their offices from the Williamsburg Savings Bank Building, 1 Hanson Place, to 356 Fulton Street, Brooklyn, N. Y.

Matthew Henry Burton, architect, has moved to 2712 Erie Avenue, Hyde Park Square, Hyde Park, Cincinnati, Ohio.

Harold F. Andrews, structural engineer and architect, announces the removal of his offices from 128 State Street to 82 State Street, Albany, New York.

W. A. Netherland and J. B. Hawkins have formed the architectural firm of Netherland and Hawkins to be the successor to the late Arthur Loomis. Joint offices will be maintained at 87-88 Equitable Life and Casualty Building, 139 South 4th Street, Louisville, Kentucky, and 1938 Ekin Street, New Albany, Indiana.

Announcement has been made of the formation of the firm of Campbell and Keller, architects, with offices at 3415 Austin Street, Houston, Texas.

The architectural firm of Craft, Gill and Walsh, 247 Park Avenue, New York City, has been dissolved. Alton L. Craft has returned to individual practice with offices at 6 East 45th Street, New York City, and Harrison Gill will continue the practice of architecture at 247 Park Avenue, New York City. Harold V. Walsh will not be engaged in active practice.

Under the terms of the will of the late Anton L. Vegliante, architect and charter member of the Architects League of Northern New Jersey, an annual award consisting of the income of the sum of $5,000 is to be awarded to some member of the League who has distinguished himself during the preceding year in the architectural world, or who because of his achievements and accomplishments merits such an award. At a meeting February 21, by unanimous action and vote of the membership, this award was made to Clarence H. Tabor, Jr., for the year 1934. In 1933 the award was given to Harry Lucht.

The Architects League of Northern New Jersey meets on the third Thursday of each month at 285 State Street, Hackensack, N. J. at 8 P.M. All architects are invited to attend. Dues are $3 annually and application for membership are solicited. The Secretary is Norman J. Hunter, 426 Cedar Lane, Teaneck, N. J. Meetings are of general interest and topics of current interest and import are dealt with. The League will hold its sixth annual dinner in April; details and date will be announced later.

The College of Architecture, Cornell University, invites applications for a fellowship and scholarships for the academic year 1935-36 as follows: (1) a university fellowship open to a graduate student in architecture or landscape architecture; (2) three graduate scholarships open to graduate students in architecture, landscape architecture or fine arts; (3) five scholarships in the College of Architecture open to graduates of four-year courses in architecture, landscape architecture or fine arts. Further information and forms of application can be obtained from The Dean, College of Architecture, Cornell University, Ithaca, New York.

The summer session of the College of Architecture, University of Michigan, extends from June 24 to August 16. The courses are designed for students of architecture, those enrolled in landscape design, decorative design, and the curriculum for teachers of art and design in the School of Education. The courses in drawing and painting may also be elected by any University student having sufficient preparation. Apply to Emil Lorch, director, College of Architecture, Ann Arbor, Michigan.

The College of Architecture, Cornell University, announces the offering of a course in design, to be given during the summer session of 1935, stressing the interrelation between architecture and landscape architecture. This course is open to students who have had three or more years of design, in either architecture or landscape architecture, or equivalent experience. The session opens Monday, July 8, and ends Friday, August 16. All correspondence should be addressed to The College of Architecture, Cornell University, Ithaca, New York.

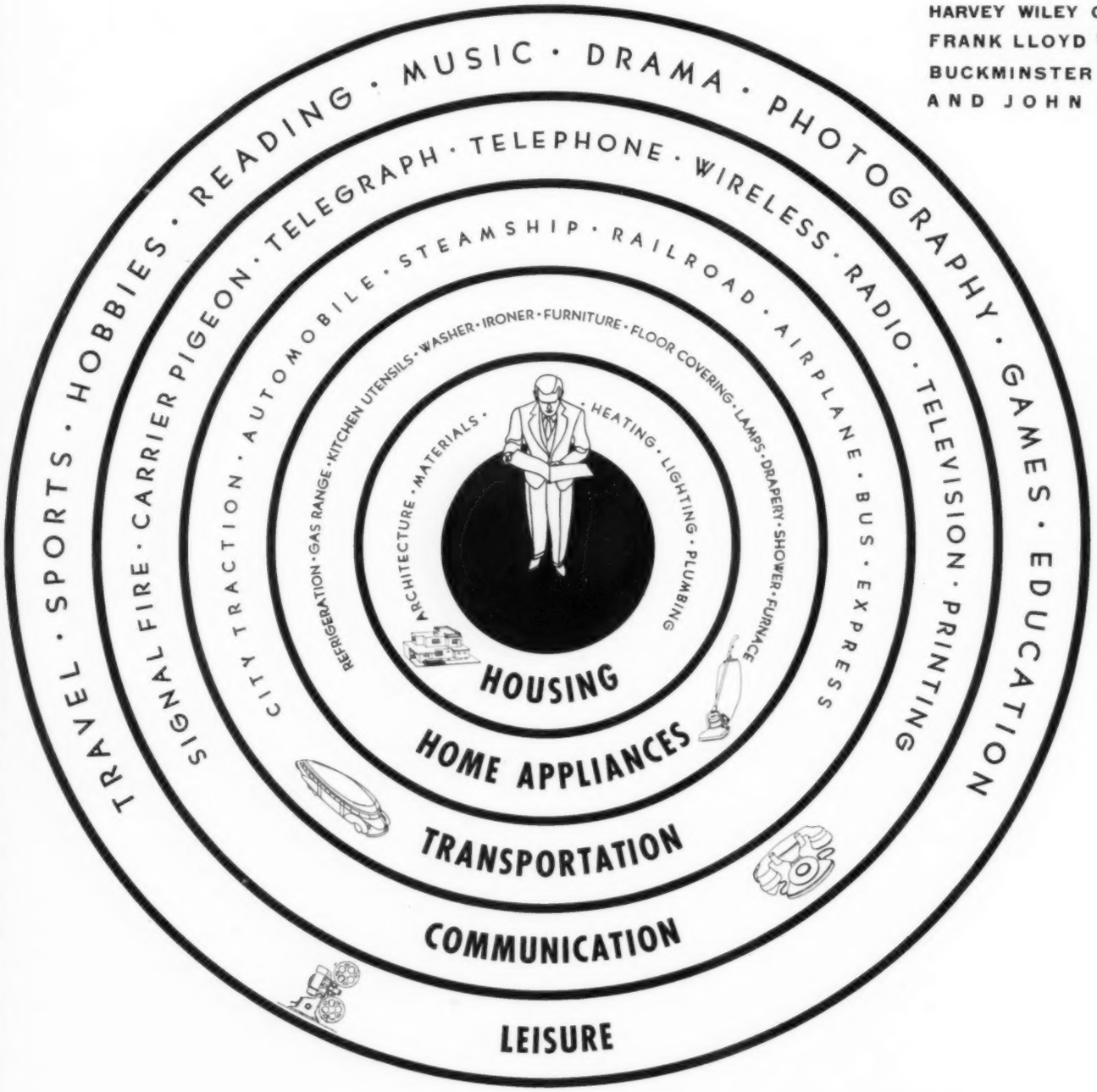
The College of Fine Arts, Syracuse University, Syracuse, N. Y., offers music, art, and architecture scholarships to freshmen students. Applications for entrance to these competitions will not be considered after June 20. For bulletin of the College of Fine Arts, application blanks or other information on the competitions, address Dean H. L. Butler, College of Fine Arts, Syracuse University, Syracuse, N. Y.

CALENDAR OF EXHIBITIONS AND EVENTS

April 4-13	Architectural exhibit at Avery Library, Columbia University, New York City.
April 8	Closing date for submission of drawings in study-competition for low-cost houses conducted by New York Chapter, A.I.A., 522 Fifth Avenue.
April 10	Lecture—"Why the Architect Must Be a Sociologist"—by Lewis Mumford. Federation of Architects, Engineers, Chemists and Technicians, 119 East 18 Street, New York City. Time: 9 P.M.
April 15-May 15	Industrial Arts Exposition at Rockefeller Center, New York City, under auspices of National Alliance of Art and Industry. Model of Frank Lloyd Wright's Broad Acre City.
April 17	Lecture—"The Future of the Architect"—by Meyer Schapiro. Federation of Architects, Engineers, Chemists and Technicians, 119 East 18 Street, New York City. Time: 8 P.M.
May 4-12	Annual Building Exposition in San Francisco.
Until May 14	Exhibition of African Art, Museum of Modern Art, New York City.
May 21-24	Sixty-seventh convention of the American Institute of Architects in Milwaukee.
July 16-20	Fourteenth International Housing and Town Planning Congress in London.
October 10-19	Architectural League Exhibition, Grand Central Palace, New York City.

INDUSTRIAL ARTS

HARVEY WILEY CORBETT
FRANK LLOYD WRIGHT
BUCKMINSTER FULLER
AND JOHN ROOT


TRAVEL · SPORTS · HOBBIES · READING · MUSIC · DRAMA · PHOTOGRAPHY · GAMES · EDUCATION
SIGNAL FIRE · CARRIER PIGEON · TELEGRAPH · TELEPHONE · WIRELESS · RADIO · TELEVISION · PRINTING
CITY TRACTION · AUTOMOBILE · STEAMSHIP · RAILROAD · AIRPLANE · BUS · EXPRESS
REFRIGERATION · GAS RANGE · KITCHEN UTENSILS · WASHER · IRONER · FURNITURE · FLOOR COVERING · LAMPS · DRAPERY · SHOWER · FURNACE
ARCHITECTURE · MATERIALS · HEATING · LIGHTING · PLUMBING
HOUSING
HOME APPLIANCES
TRANSPORTATION
COMMUNICATION
LEISURE

■ Harvey Wiley Corbett, Frank Lloyd Wright, John Root and Buckminster Fuller are architecture's representatives in the forward looking Industrial Arts Exhibition to be held at Rockefeller Center in April and May. Frank Lloyd Wright describes in this issue of THE ARCHITECTURAL RECORD his Broadacre City model which forms the focal point of the Exposition. Harvey Wiley Corbett contributes a summary on "Industrial Design and the Architect."

THE INDUSTRIAL ARTS EXPOSITION

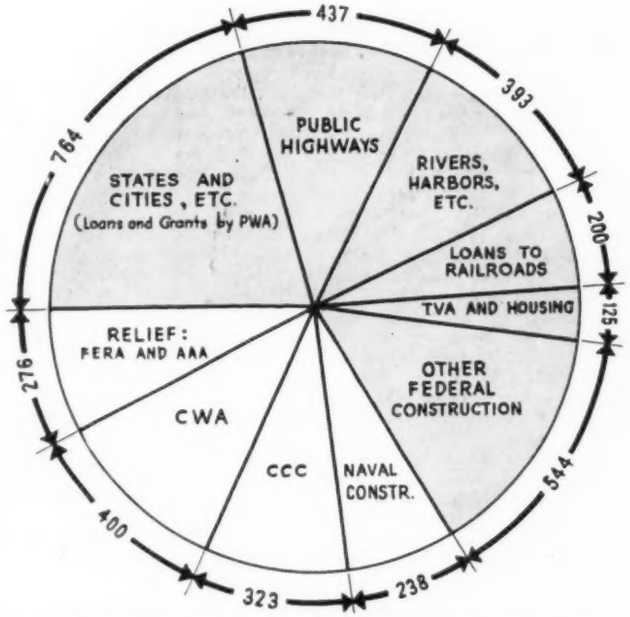
APRIL 15 TO MAY 15 ■ ROCKEFELLER CENTER ■ NEW YORK CITY

PUBLIC WORKS: TWO PROGRAMS COMPARED

Direct stimulation to the construction industries was afforded by the Federal program of public works now in its second year. As allotments have been exhausted a new Federal plan of stimulation nears. It is with these two programs of public works construction—the old and the new, as proposed—that the current article treats. All charts on the old program are based on data from the Daily Statement of the United States Treasury.

By L. SETH SCHNITMAN,

Chief Statistician, F. W. Dodge Corporation



FIGURES DENOTE MILLIONS OF DOLLARS ALLOTTED

THE OLD PROGRAM

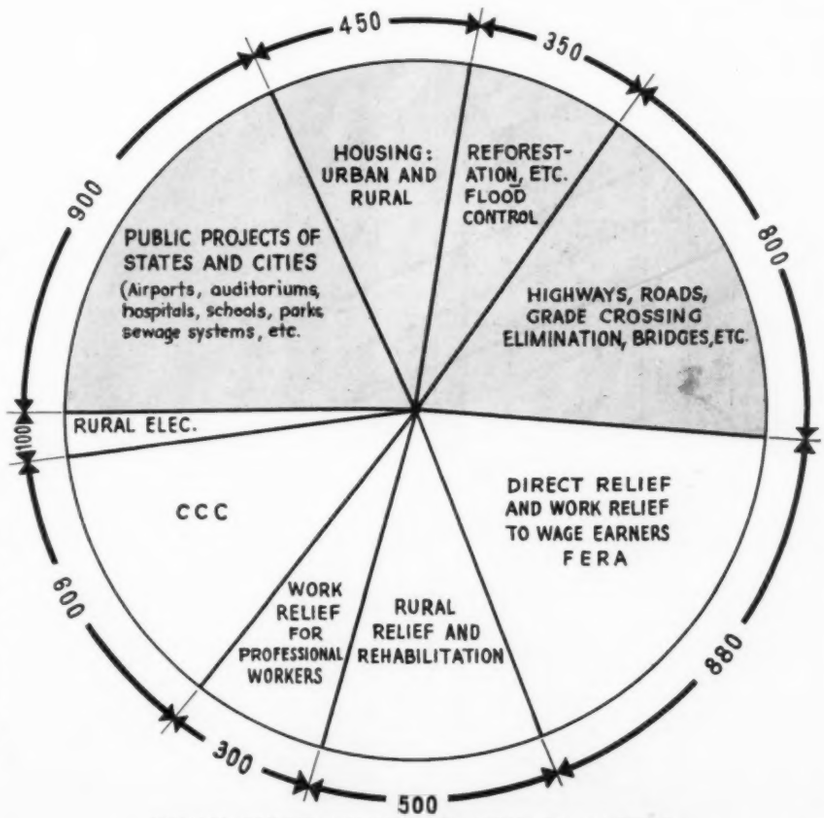
The Public Works Administration was created almost two years ago under the provisions of Title II of the National Industrial Recovery Act. This legislation carried an appropriation of $3,300,000,000. About a year later the 73rd Congress passed the Emergency Appropriation Act of 1935 (fiscal year); as a result an additional sum of $400,000,000 was earmarked for PWA purposes. Of this total of $3,700,000,000, less than $2,500,000,000 or only about two-thirds was ultimately allocated for construction projects of all descriptions.

The chart shows an approximate distribution of the $3,700,000,000 total as between construction and non-construction items, the shaded segments representing construction. With the exception of the naval shipbuilding program practically all of the remainder allocated for non-construction items is classifiable as relief, direct and indirect. Since the passage of the NIRA in June 1933, considerable additional sums for relief purposes (CCC, FERA, CWA, etc.,) have been made available but these are not here considered.

Virtually all allotments under the PWA program for construction have already been translated into contracts; in fact construction on many projects has actually been completed. On the following pages, flow charts trace the cumulative expenditures by the Federal Treasury on these contracts but these payments lag materially behind the actual progress of the construction program. A tabular summary at the end traces the development of the contract record under the PWA at convenient intervals; this should prove helpful to the reader who would appraise the probable results of the proposed new program.

THE NEW PROGRAM

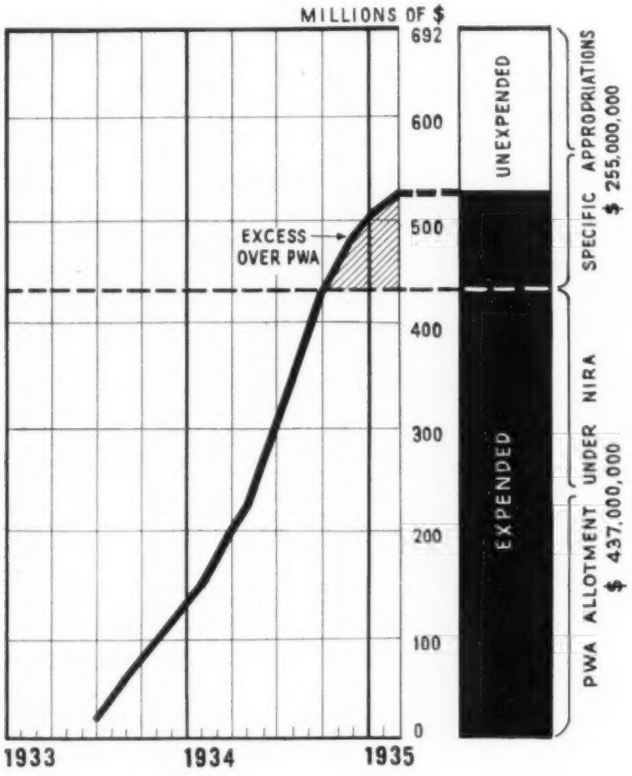
The major characteristics of the proposed plan for the extension of public construction are shown in the chart to the right. Here has been attempted an approximate distribution as between construction items and non-construction items; as in the above chart construction items are shown by the shaded area. Of the $4,880,000,000 provided for, construction items account for $2,500,000,000 or only 51 per cent of the total. It is significant that although the new program is more than 31 per cent greater than the old, the totals available for construction items are virtually the same, i.e. $2,500,000,000. This similarity may be purely coincidental but it affords at least one basis for appraising the new program. Under the pending proposal the President is given large discretionary powers in the execution of the new program. Though the exercise of such powers might seriously distort the charted alignment between construction and non-construction projects, no allowance for this element has here been attempted because such would be entirely in the field of speculation.



FIGURES DENOTE MILLIONS OF DOLLARS ALLOTTED

THE OLD PROGRAM—FEDERAL PROJECTS

In the subjoined charts are given the approximate cumulative developments under the current PWA program as they relate to Federal projects. In each case the line traces the expenditures of the Federal treasury while the bar indicates the total allocation under the original fund of $3,700,000,000. All charts are as of April 1, 1935.

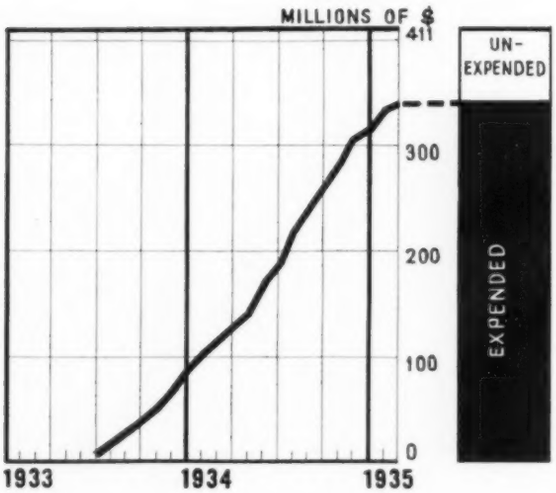


1. Public Highways

As may be seen from the chart, the total allocation of funds for highways under the NIRA has already been expended. In addition a sizable amount of the supplemental specific appropriation for this item has been spent. The supplemental sum of $255,000,000 was not included within the authorized total of the original $3,700,000,000 program nor in the distribution shown in the chart on page 19.

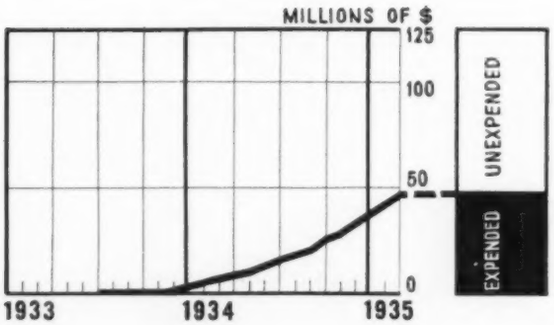
Virtually all the highway construction provided for in the allotted totals, under both the NIRA and the specific appropriations, is now either under contract or completed. Within six months after the PWA program started to function the maximum rate of contract-letting had been attained; since January 1934 there has been an intermittently declining monthly contract trend until by February of this year the contract volume had receded to a level lower than at any time since the advent of the program in July, 1933.

Under the proposed new program, highways, roads, grade crossing eliminations and bridges are to total $800,000,000. In the main, this new program is essentially no larger than the old making due allowance for the specific appropriations and some for the bridge work which has been elsewhere classified under the old. From this it would appear therefore that within six months from the time the new program gets under way contracts for highways should again reach the peak expansion.



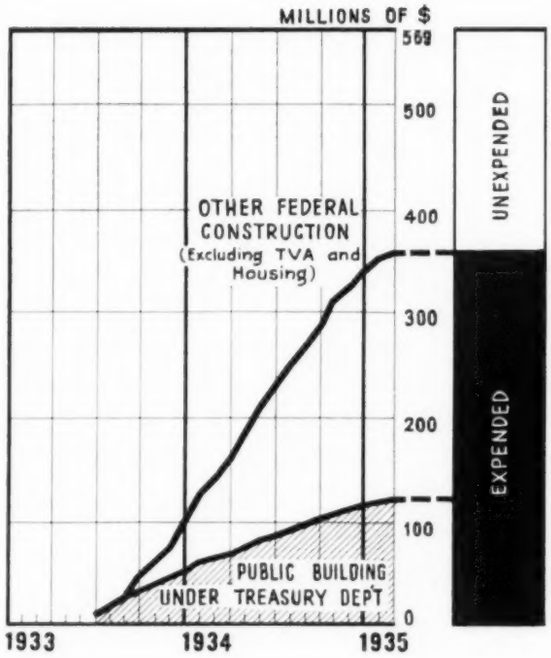
2. Rivers and Harbors

For rivers and harbors the PWA original allotments totaled $251,000,000. To this was added $95,000,000 out of the supplemental funds of the Emergency Appropriation Act. The Boulder Canyon project, which is being constructed from funds from specific appropriations as well as from the two funds named above, has been included in this chart for convenience; altogether this project has thus far been allotted the round sum of $65,000,000. Together these allotments amount to $411,000,000. This total does not check with that given in the chart on page 19 because the latter excludes the $18,000,000 allocation for Boulder Canyon under specific appropriation. Treasury expenditures for rivers and harbors, inclusive of Boulder Canyon, both out of emergency PWA funds and out of general funds, are charted in the current instance; for this reason the unexpended portion of the allotments under PWA appears smaller than is actually the case. However, it is believed that the equivalent of practically all the river and harbor work authorized under the PWA is now either under contract or being done by force account or is actually completed.



3. TVA and Housing

For convenience in charting, the allocations for emergency housing, subsistence homesteads, and the Tennessee Valley Authority have been grouped together. Originally, emergency housing alone had been allocated a total under the PWA program slightly in excess of the total of $125,000,000 as it now stands for the above rather arbitrary grouping. But difficulties beset the housing plan; as a result allocations have since been reduced for this item to only one-fifth the original size. The troubles of the old housing program have now to some extent been removed but there are no assurances that additional ones do not loom for the new one which sets out with a tentative allocation of $450,000,000.



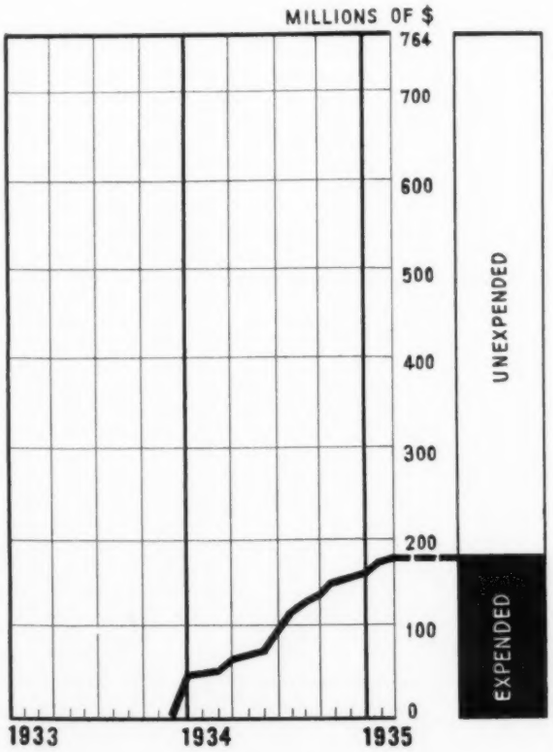
4. Other Federal Construction

In this category are included all other federal projects, both public building construction and sites under the supervision of the Treasury Department out of general funds and all other projects under the PWA. All building and construction work of every other unenumerated type whether army barracks, lighthouses, post offices, warehouses, schools, hospitals, institutions, parks, thus find their place in this classification, with the sole exception of naval ship construction which for purposes of this article was classified as a non-construction item. The total allocation here differs from that shown in the chart on page 19 because the latter figure, i.e. $544,000,000, excludes an item of $25,000,000 which has been included in the current chart to take care of administrative expenses.

Under the new program there is no specific allotment planned that would cover all the types of Federal projects already undertaken under the current schedule but obviously with the latitude that is afforded there can be little doubt that many of the types of the old will be extended into the new with the probable exception of post offices and general office building in the city of Washington.

THE OLD PROGRAM—NON-FEDERAL PROJECTS

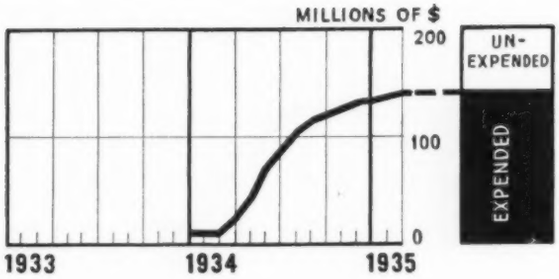
Two distinct classifications of non-Federal projects are here considered: those undertaken by States, cities and other public bodies either through loan or grant or both; and those undertaken by railroads with loans from the Federal government.



1. States and Cities

In this chart is shown the total amount of the PWA allocations for non-Federal projects of state and local governments such as schools, hospitals, institutions, parks, sewage systems, power plants, water supply systems. This total includes funds from both the allocation under the NIRA and the Emergency Appropriation Act of 1935 together with the apportioned sums under the $250,000,000 revolving fund of the RFC which authorizes that corporation "to purchase marketable securities acquired by the Federal Emergency Administration of Public Works." For convenience, sundry projects of quasi-public character such as the Triborough Bridge and the Midtown Tunnel in New York City are grouped here.

It is of interest to note that repayments and collection on account of loans and grants to states and cities pursuant to the provisions of the revolving fund are now well in excess of $60,000,000. It is likewise of interest to note that under the newly proposed program this classification of projects is to receive an allocation of $900,000,000. Due to the sluggishness in expenditures and even in contracts in the old program occasioned in large measure by the inability of local governments to qualify as good financial risks, there is some basis for questioning the speed of the new. Thus far there are no indications, however, that the new Federal program for local governments will proceed along the same cautious lines laid down in the old.

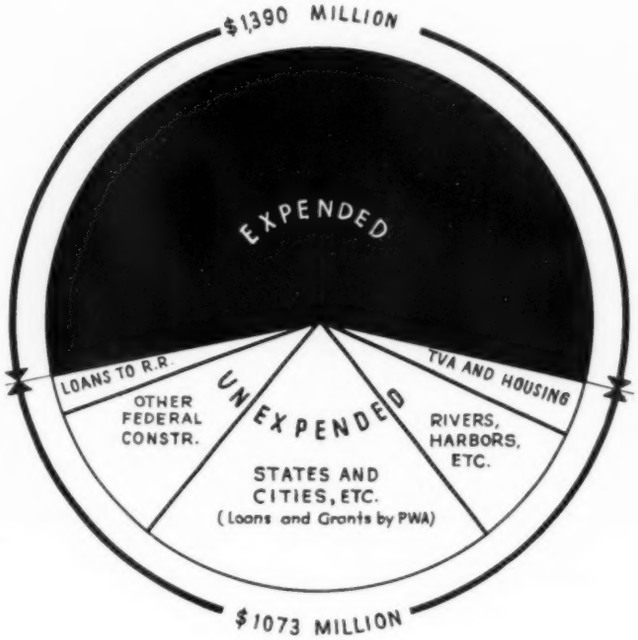


2. Loans to Railroads

Besides receiving large loans from the RFC to bolster their financial structures, railroads have benefited also under the PWA. Allocations and advances by the PWA were largely for necessary maintenance and construction. What may be expected in the railroad field over the course of the next Federal program of public works is difficult to determine but with the financial conditions of the industry none too bright, government may be expected to provide funds for needed maintenance and construction in modest amounts, these in addition to funds for grade crossing eliminations specifically provided for under the proposed allocation for highways.

SUMMARY FINANCIAL CONDITION (as of April 1, 1935)

As a practical matter the current PWA objectives are much nearer completion than is indicated in the chart to the right. Expenditures are made by the Federal treasury only upon duly audited vouchers which have been checked by the General Accounting Office, all of which requires considerable time. Nonetheless even on the basis of expenditures, almost 60 per cent of the sums which were earmarked in the PWA $3,700,000,000, for what have been classified here as construction items, has been exhausted. If treasury expenditures are no more rapid on the proposed new program than under the current one there will probably be at least one billion dollars of the construction fund of approximately $2,500,000,000 yet to be expended at the beginning of 1937.



CONTRACTS UNDER THE CURRENT PROGRAM

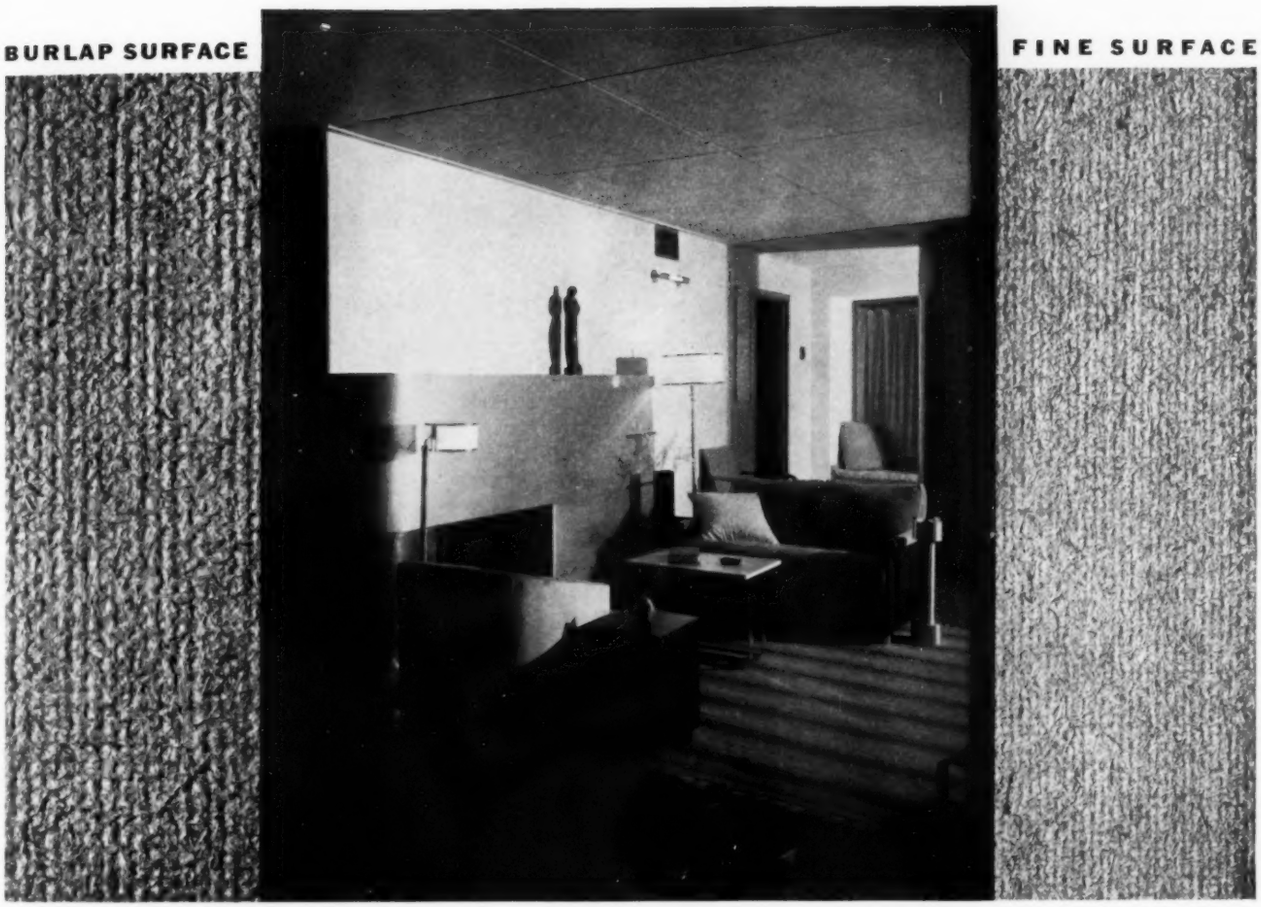
In the 21 months which have elapsed since the PWA came into being, construction projects in the amount of $2,667,000,000 have been undertaken in the 37 eastern states. During the same period, public projects, as distinguished from private construction, amounted to $1,650,000,000 or about 62 per cent of the recorded total for the period. Projects undertaken with PWA funds in the Rocky Mountain and Pacific Coast areas in the same period have accounted for some 500 millions more. Unrecorded force account construction would add many millions more to the volume of construction which was made possible by the PWA within the authorized limits of that agency of something less than 2½ billions. Should the proposed new program proceed as rapidly as the last one the construction phases of it would require the remainder of the current year and all of 1936. On this basis an average of about $125,000,000 of construction per month would get under way, allowing for the Far West and for force account work as well as work let under contract. This would be the average, but the peak month would probably show a total half again as great, likely occurring shortly after the beginning of 1936.

CONSTRUCTION CONTRACTS in the 37 Eastern States on Publicly-Financed Projects*

1933	Actual	Cumulative at End of Period
3rd quarter	$138,487,400	$138,487,400
4th quarter	382,761,100	521,248,500
1934		
1st quarter	348,826,400	879,074,900
2nd quarter	222,915,900	1,092,990,800
3rd quarter	190,407,900	1,283,398,700
4th quarter	213,241,700	1,496,640,400
1935		
1st quarter**	154,000,000	1,650,000,000

* Includes force account work where figures were available.
** Approximate.

BURLAP SURFACE



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Decoration . . . Insulation . . . Sound Quieting

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For new building or modernization—whether it be a house or any other type of structure—select a building board that does more than cover studs.

In Insulite you get such a building board. Its choice of surfaces—burlap texture on one side and fine matte surface on the other, make it a wise choice for wall and ceiling treatment. Although it may be finished with any type of decorative material, its cream-white color requires no decoration—provides high light reflection.

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Its sound absorption efficiency assures quieter rooms. It reduces the transmission of noise from one room to adjoining rooms or to rooms above and below.

Insulite Building Board as well as other Insulite products developed over a period of twenty-one years are sold by lumber dealers everywhere. See our complete catalog in *Sweet's.* For specific information relating to your decoration, insulation and sound quieting problems, write our engineering service department. The Insulite Company, Dept. AR2, Builders Exchange Bldg., Minneapolis, Minnesota.

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Architects are invited to use the coupon on this page as a convenient means of obtaining manufacturers' publications describing in detail the products and materials mentioned

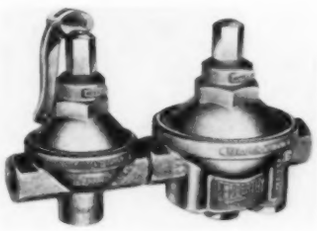
D5-1
"CEL-O-GLASS" FOR DECORATION

Acetol Products, Inc., announces a new use for wire-coated cellulose acetate material. Tests have shown that for interior decoration colorful effects can be obtained. This material is especially recommended for use in stores, beauty parlors, theaters, auditoriums, churches, hospital corridors and reception rooms, funeral directors' reception rooms and chapels, dentists' and physicians' offices and similar business and professional places. When used in columns for lighting effects, this new material will not buckle or become unsightly. It is light, inexpensive and easily handled and, because of its flexibility, permits many novel designs and shapes. It is easy to cut with an ordinary pair of scissors; is durable and weatherproof; will not warp, crack, tear nor break. Also, it is heat resisting.

D5-2
CELOTEX INTRODUCES FACTORY VAPORPROOFED STORAGE INSULATION

The Celotex Company, Chicago, has placed on the market a factory-sealed cold storage insulating block that is said to possess exclusive advantages under the severe moisture conditions encountered in cold storage operation. The new product is known as Celotex Vaporproofed Low Temperature Insulation. The sealed block is designed to provide better and more consistent moisture protection than is obtainable by asphalt and plaster applications on the job, in which the human element is always involved. If plaster or asphalt are used with the new Celotex product, additional protection is provided.

D5-3
PENBERTHY PRESSURE AND RELIEF CONTROL



The Penberthy relief valve and reducing valve, manufactured as a unit, is said to be an efficient means of automatically keeping a hot water system filled with water and for automatically relieving any excess pressure that may occur in that system. This combination unit is available in two models: Model A for extra large capacity, and Model B for standard control. Both are constructed of high-grade steam bronze, of advanced design and skilled workmanship. They comply with the A.S.M.E. code. A folder, illustrated in color, contains full details.

D5-4
STURTEVANT MULTIVANE AND SILENTVANE FANS

One of the two new catalogs issued by B. F. Sturtevant Co., describes the Multivane Fan, Design 6, suited especially for heating, ventilating and air conditioning purposes in public buildings such as schools and hotels. This fan, small in size for a given duty, retains the forwardly curved blade with low tip speed and low outlet velocity. The other catalog describes the Silentvane Fan, Design 5, used for more exacting ventilation projects in large public buildings, for vehicular tunnels and for many industrial applications. It is said to be particularly valuable where power consumption is an important factor. Where direct connection to the driving motor is desired the Silentvane, owing to its higher speed, permits the use of inexpensive motors with a consequent lower price per unit.

D5-5
NEW ALUMINUM PAINT

A new flexible aluminum paint, said to provide a scale-like protective metal sheathing and a smooth, brilliant finish, has recently been perfected by the Roxalin Flexible Lacquer Company. Dirt and dust do not attach themselves readily to the surface. It washes easily and possesses great resistance to chemical fumes, humid atmospheres, corrosion, rust and decay. One standard grade serves equally well both indoors and outdoors. A single application is claimed to cover stained and discolored surfaces completely with a metallic coat of lasting brilliance.

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about any products mentioned, write the index numbers in space below. For literature about products *advertised* in this issue, give name of the product and manufacturer. Return coupon to The Architectural Record, 119 West 40th Street, New York, N. Y.

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Name _____

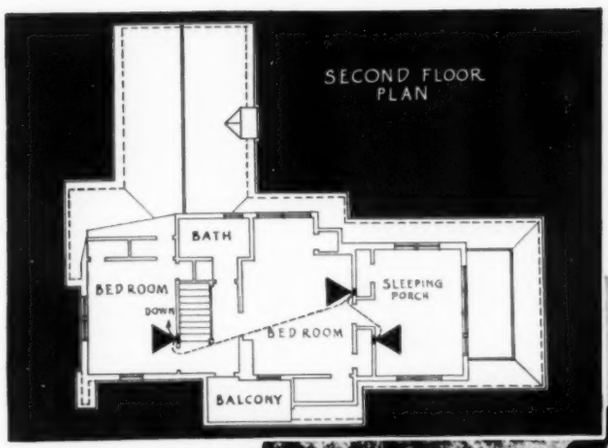
Position _____

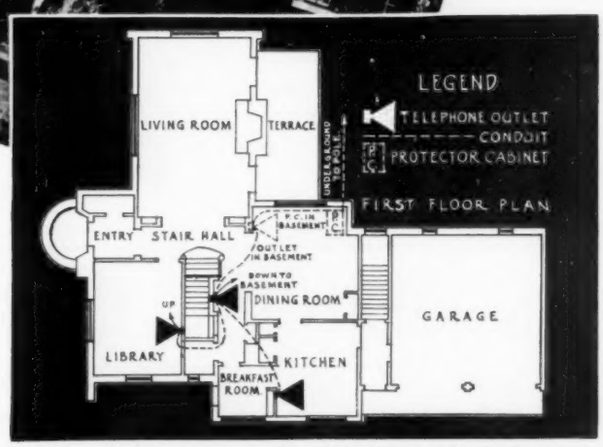
Street _____

City and State _____

Well-planned, built-in telephone arrangements help make this

A MODEL HOME





Built-in conduit and seven outlets, including one in the basement, provide for telephone convenience in the residence of Mr. Carl Mussetter, 1116 Chautauqua Parkway, Des Moines, Iowa. This was the 1933 model home sponsored by the "Des Moines Register & Tribune." Carl V. Johnson, Architect, Des Moines.

The architect of this model home comments: "Certain features must be incorporated in the home of today for the fullest comfort and convenience of the owner. Proper telephone provision is one of them. Too often it is neglected on the excuse, 'We can always get the telephone in.' While this is true, it cannot be done as easily and neatly as when properly planned for.

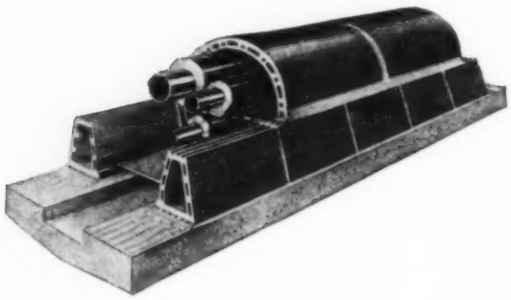
"Since it *is* so easy and inexpensive to provide adequate telephone arrangements at the time of building, I believe it should be carefully considered — telephone service brought in like electric service in the least conspicuous way — and telephone outlets located where they may be needed for the present and the future."

Because of increased activity in home modernization and new home construction, there should be many projects in which the installation of telephone conduit will make grateful clients. Just call your telephone company Business Office for full details.

FOR FURTHER INFORMATION ON BELL SYSTEM TELEPHONE SERVICES AND EQUIPMENT, SEE SWEET'S CATALOGUE

D5-6
WESTINGHOUSE ANNOUNCES NEW STREAMLINE WATER COOLER

Westinghouse has announced the addition of three new water coolers to their present line of Micarta coolers. These new models are cataloged as the "Streamline Coolers" and are available in three sizes. All will be housed in a sheet steel cabinet, finished in multicoat black Dulux. They are streamline in appearance, having a recessed sub-base which prevents scarring of the panel. The top is made of one-piece stainless steel, and the bubbler and hand valve are brass, chrome plated. All coolers have an outelt at the top for a glass filler.



D5-7
A NEW UNDERGROUND STEAM CONDUIT SYSTEM

A new underground steam conduit system named "Therm-O-Tile" has been developed by H. W. Porter & Co., Inc., of Newark, New Jersey. Work of conduit installation is said to be simplified. Pipe lines, supported directly upon a four-inch concrete base, independently of the tile envelope; are held by special cast iron adjustable supports. This arrangement prevents strain on the joints of the conduit envelope while the lines are expanding and contracting in service. All tile sections are of double thickness with integral air spaces, a design that gives high strength with minimum weight and low thermal conductivity. The conduit is readily accessible at any point, or the top section of any run may be lifted without disturbing the pipe supports or joints in the bottom sections. The tops may then be cemented back in place after the repairs to pipe lines are completed.

D5-8
REMODELING STORY TOLD IN PICTURES

"How to Solve Several Remodeling Problems With One Material—At One Low Cost," is the title of a profusely illustrated folder published by The Insulite Company of Minneapolis. According to an announcement, two of the "Before" and "After" pictures were recently given nation-wide prominence through their selection by the Federal Housing Administration for their "Better Housing Bulletin." The center spread of the folder reproduces nineteen photographs of representative remodeling work in homes, schools, churches, theaters, factories, garages, etc.

D5-9
TILE FLOORS

A folder, illustrated in color, describes Alundum Ceramic Mosaic Tile which is said to be highly abrasive, non-slip and durable. It is produced in nine colors, guaranteed for ten years against heaviest foot traffic and it is used as flooring for stores, store entrances, showers, pools, etc. The manufacturer, Norton Company, of Worcester, Mass., offers copy of the folder.

BUILDING OWNERS

who, during recent years, have had to replace ordinary materials eaten away by acids or rust, appreciate now more than ever

DURIRON ACID PROOF DRAIN PIPE

THE DURIRON COMPANY, Inc.
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See Our Catalog in Sweet's

We're Not Back-Seat Driver

Being specialists ourselves, we are quick to recognize and place confidence in the abilities of other specialists. Therefore, when it comes to the place of the architect in the swiftly growing air conditioning picture, we want to go on record as being convinced that the architect is the proper party to represent us to his client. Except by special invitation we do not wish to appear other than through the architect's recommendation. We have no desire to take the wheel out of his hands.

Kelvinator experience—covering more than 20 years of specialization in controlling temperatures—is something the architect can rely on. Kelvinator's system of EXACT SELECTION, whereby exactly the right equipment is selected to do each job most economically, protects both you and your client. Kelvinator's trained air conditioning engineering staff is always at your service. . . . KELVINATOR CORPORATION, *14250 Plymouth Road, Detroit, Michigan. Factories also in London, Ontario, and London, England.*

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for every need of merchants, manufacturers and institutions

EXACT SELECTION

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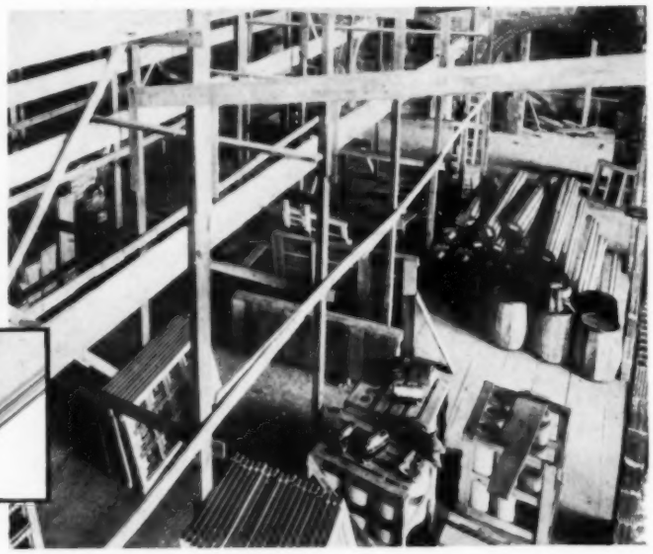
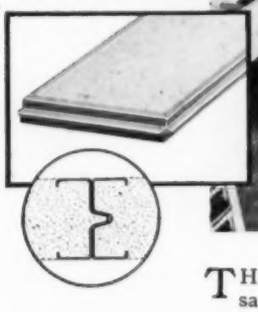
STRENGTH AT LOW COST

In Fire-safe Floor Construction

The Plank floor illustrated was unaffected by exposure to winter's snow and ice, followed by months of heavy job traffic.



Steel tongued and grooved forms I-Beam.



THERE'S strength and safety in STEEL. That's why *Gypsteel Plank** is bound with galvanized, copper bearing steel, tongued and grooved to mesh and form a strong 2" steel I-Beam. Steel mesh reinforces the gypsum core, too.

Gypsteel Plank is a complete structural unit. The body is not just ordinary gypsum, but an extra dense, extra hard laboratory product that licks the worst job conditions. These are the qualities that insure *uniform strength* on every job. *Plank* has been tested and proved by the Civil Engineering Testing Laboratories, Columbia University.

Plank speeds up construction—handles like wood, cut, sawed, nailed or bored . . . eliminates water . . . requires no mixing or pouring. Moreover, *Plank* is low enough in price to be important where cost is the *first consideration.* Let us show you how *Plank* saves time and money in floors, roofs, partitions. Write for FREE BOOKLET.

*The term PLANK as applied to cementitious building products is a trade mark of the American Cyanamid and Chemical Corporation.

GYPSTEEL PLANK

U. S. Pat. No. 1,854,396
Canadian Pat. No. 328,519
Other U. S. and Foreign Patents Pending

STRUCTURAL GYPSUM DIVISION
American Cyanamid & Chemical Corporation
30 Rockefeller Plaza New York, N. Y.

D5-10
NEW CATALOG ON AIR CONDITIONING

Comfort Is In The Air, a catalogue issued by the Bryant Heater Company, describes a line of heating and air conditioning equipment designed for home use. It seeks to clarify various phases of the subject of air conditioning, and to interpret advanced principles of heating and air conditioning construction and design.

D5-11
ORNAMENTAL PERFORATED METAL

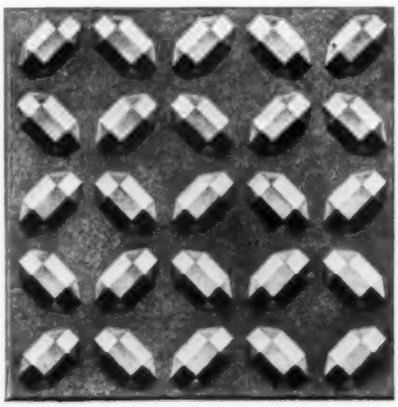
A folder published by Hendrick Manufacturing Company illustrates six standard designs most favored for moderately priced radiator enclosures, for light grille patterns, etc. The steel used for these perforated metal sheets is a special, bright finish pickled steel said to be especially well adapted for finishing with paint, enamel or lacquer.

D5-12
KAWNEER SEALAIR WINDOWS

Sealair Windows, manufactured by the Kawneer Company of Niles, Michigan, are made in solid aluminum or bronze for every window purpose. New catalog illustrates the variety of types available, including weight-hung, casement and any combination of inswinging, outswinging, hinged, pivoted, or projected sash. Catalog shows construction details which insure Kawneer windows of being dust-proof, weather-proof and rattle-proof.

D5-13
ELIMINATING SHRINKAGE IN WOOD CONSTRUCTION

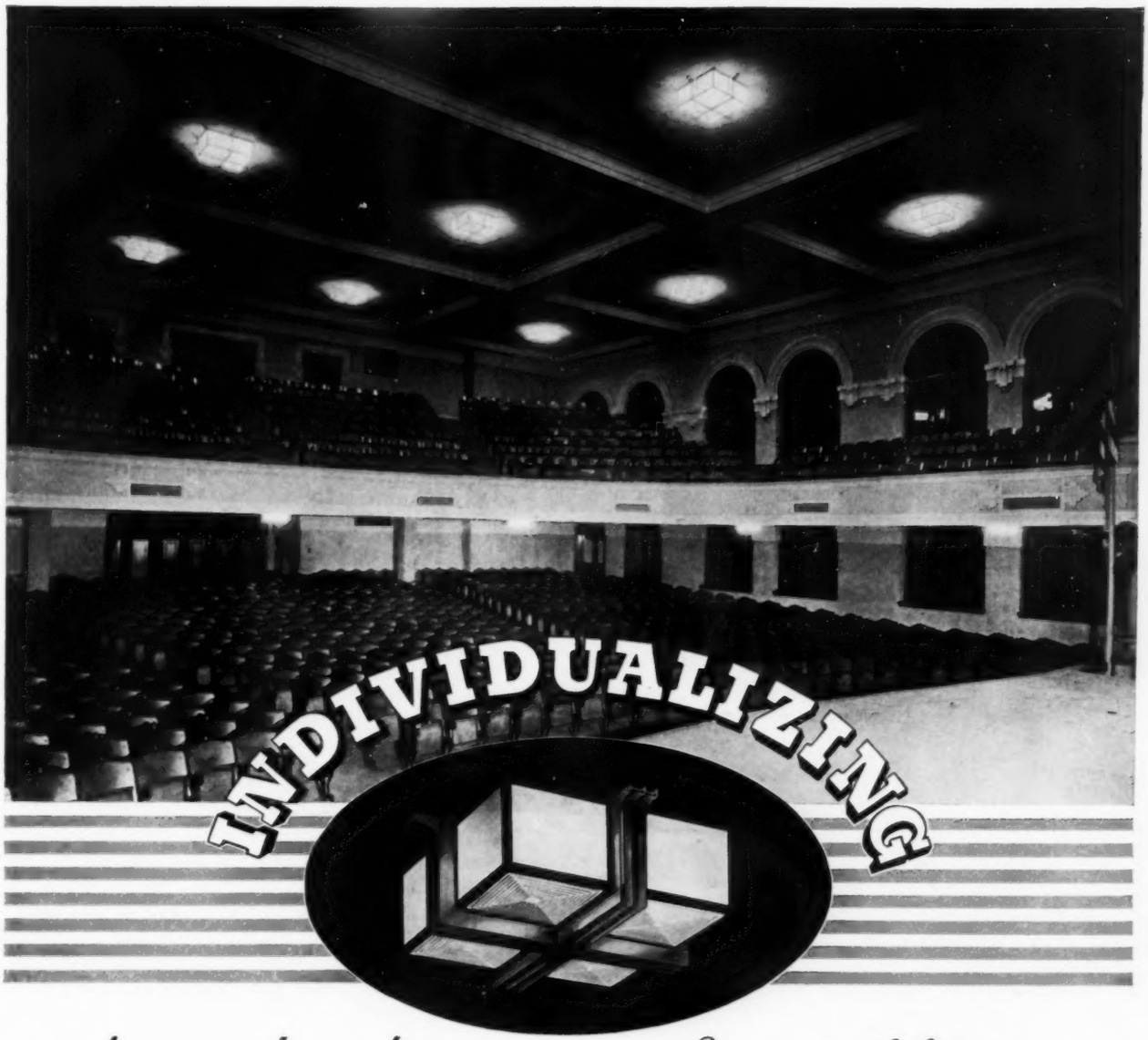
Lumber shrinkage, causing a building to "settle," is capable of effecting costly damages. A device being produced by the Walker Manufacturing Company of Chicago is said to eliminate this difficulty. As explained in the manufacturer's literature shrinkage is not prevented, but its effects are avoided by the use of an inverted "U" shape metal shoe placed over the joists.



One-Half Actual Size

D5-14
NEW FLOOR PLATE

Multigrip, a new floor plate manufactured by Illinois Steel Co., has recently been announced. The design of the plate has been developed by long experimentation to assure the highest degree of skid resistance from every angle. Other features of the new plate are its comfort under foot, for while it offers a sure tread there are no sharp protuberances. All lugs have a flattened top surface. Multigrip may be cleaned readily and drains freely. There are no pockets in which water can accumulate.



the Lighting Installation

An interesting example of the use of architectural lighting elements for modernizing and improving the interiors of public buildings is the above picture of the Oak Park High School Auditorium, Illinois. Macbeth B&B illuminating plates were used by the Beardslee Chandelier Manufacturing Company of Chicago in making these individual and attractive new units. They replaced outdated totally indirect bowls. Not only was the appearance of the entire interior greatly improved but without any increase of wattage consumed the foot candle intensities were increased 150% at seat level in the main area. Complete details on request. MACBETH-EVANS GLASS COMPANY, Charleroi, Pa.

MACBETH

Architectural Lighting Elements

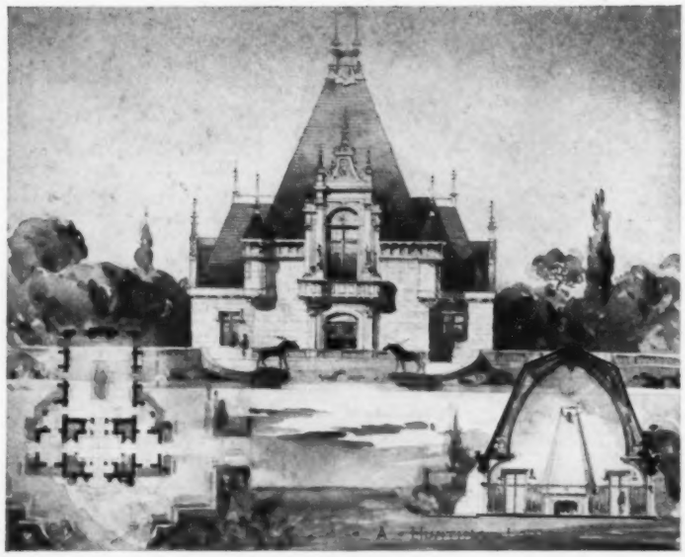
HIGGINS' INK ATELIER

CONDUCTED BY ARTHUR L. GUPTILL, A.I.A.

..for the "ESQUISSE-ESQUISSE"

HIGGINS' WATERPROOF BLACK INK

For quick work in design, where time is at a premium, this pair of inks is most popular. The waterproof ink, used full strength, has many uses, as in poché, lettering, borders, etc. It can be diluted by means of ammonia.



A TWELVE HOUR SKETCH PROBLEM

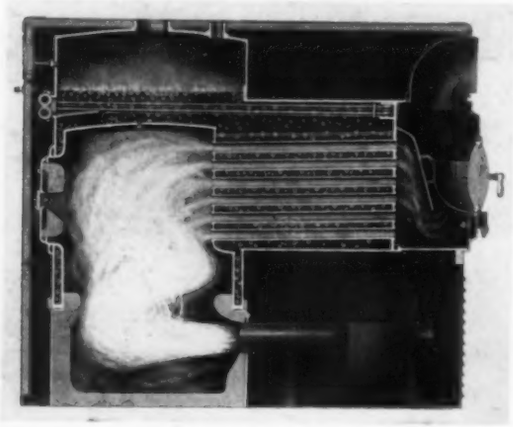
HIGGINS' GENERAL BLACK INK

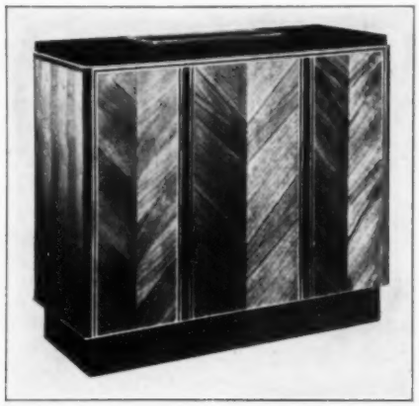
The "general" ink, being soluble in water, is particularly suited to light line work, whether free-hand or instrumental, and to wash work. Its solubility when dry makes changes or corrections remarkably easy.

CHAS. M. HIGGINS & CO., Inc. 271 NINTH STREET BROOKLYN, N.Y.

D5-15
THE FITZGIBBONS OIL-EIGHTY AUTOMATIC

Economy of space, elimination of unnecessary jacket covering, easy accessibility from three sides for burner installation and service, are the outstanding characteristics of the Fitzgibbons Oil-Eighty Automatic for the enclosure of the gun-type oil burner. The illustration shows the Fitzgibbons Tanksaver, an instantaneous domestic hot water coil, which eliminates the storage tank and supplies summer and winter hot water; the large combustion chamber; the refractory door with shielded peephole; a mass of small diameter tubes which break the flow of hot gases into many small streams; the Thermalizer baffle-plate, which apportions the flow of gases through these tubes, assuring that every tube does its share of the work.

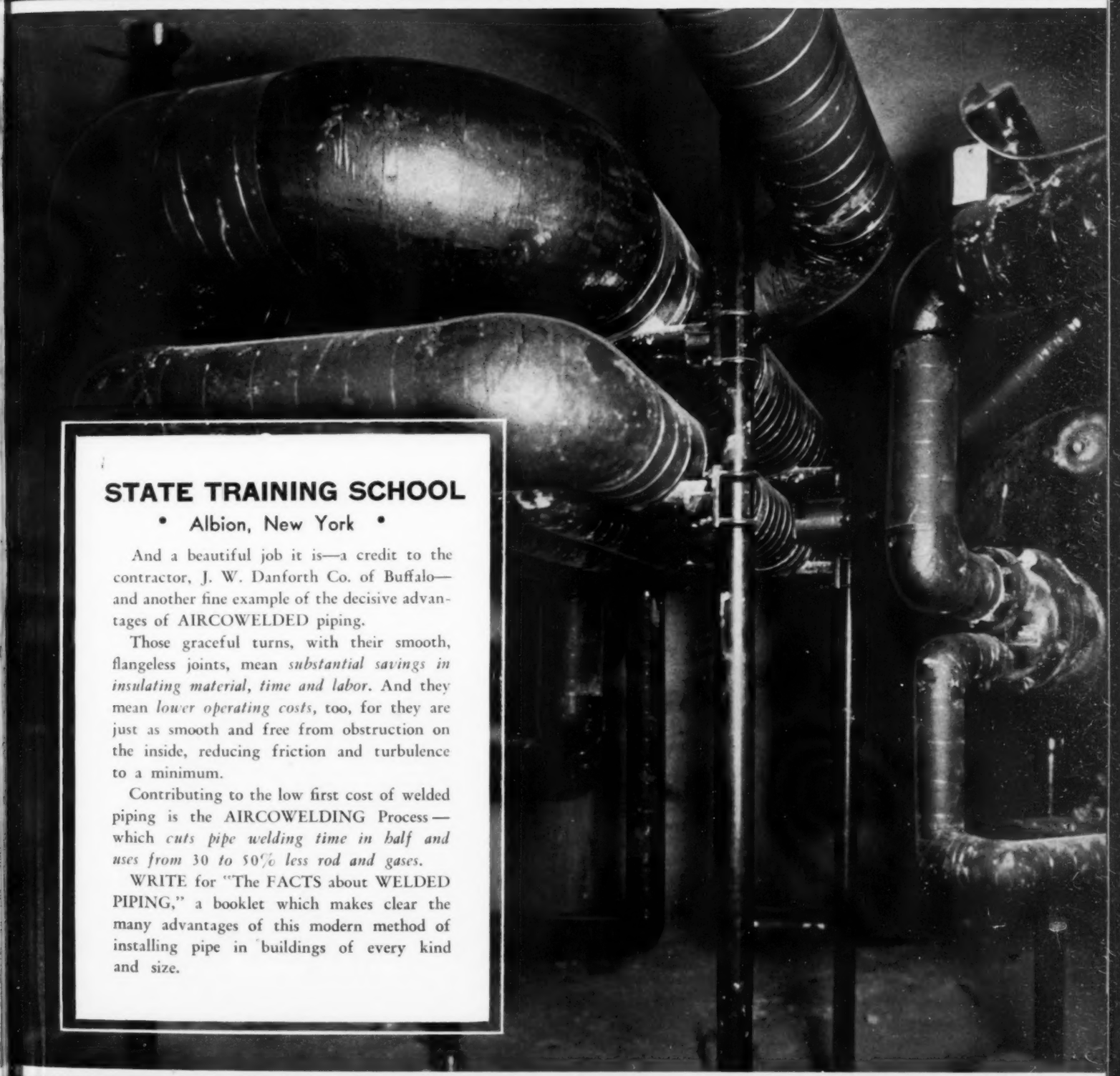




D5-16
YORK ANNOUNCES PORTABLE AIR CONDITIONER

Portable and air cooled so that no water connections are required, a new self-contained air conditioner is announced by the York Ice Machinery Corporation, York, Pa. A special feature of the new unit is its provision for positive introduction of fresh air into the conditioned space. With all elements incorporated inside a cabinet, the unit provides for cooling, dehumidifying, cleaning, circulating, and freshening air in a room. The conditioner is de-

Another AIRCOWELDED piping job



STATE TRAINING SCHOOL

• Albion, New York •

And a beautiful job it is—a credit to the contractor, J. W. Danforth Co. of Buffalo—and another fine example of the decisive advantages of AIRCOWELDED piping.

Those graceful turns, with their smooth, flangeless joints, mean *substantial savings in insulating material, time and labor.* And they mean *lower operating costs,* too, for they are just as smooth and free from obstruction on the inside, reducing friction and turbulence to a minimum.

Contributing to the low first cost of welded piping is the AIRCOWELDING Process—which *cuts pipe welding time in half and uses from 30 to 50% less rod and gases.*

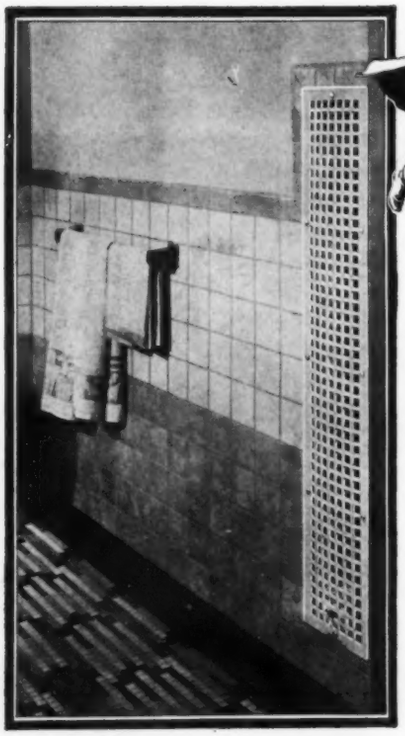
WRITE for "The FACTS about WELDED PIPING," a booklet which makes clear the many advantages of this modern method of installing pipe in buildings of every kind and size.

AIR REDUCTION SALES CO.

General Offices: 60 East 42nd St., New York, N. Y.

DISTRICT OFFICES and DISTRIBUTING STATIONS in PRINCIPAL CITIES

A NATION-WIDE WELDING and CUTTING SUPPLY SERVICE



FOR the next BATH ROOM you design... Specify

Thermador EVERHOT

PROGRESSIVE architects have been quick to sense the possibilities of the NEW Thermador specially designed Electric Bathroom Heater. Easy to install. Takes up little space—9 inches wide, 48 inches tall—and gives radiant heat from head to heels FASTER than any other type. Standards colors: White, Ivory, Nile Green. Special colors slightly extra. Equipped with switch on grille. Price list—

Cat. Number	*Watts*	*Volts*	*Price Complete*
LR 161	1650	115	$23.50
LR 162	1650	230	$24.50
LR 202	2000	230	$26.50

Grille Size 9″ x 48″ x ¼″ Shipping weight (heater) 10 lbs.
Wall Box 7″ x 46″ x 4″ Shipping weight (wall box) 11¼ lbs.

Master Duty Wall Insert Type W

COMPLETE HEATING EQUIPMENT!

We are the originators of Fan-Type Electric Heaters. A complete line of Electric Room Heaters in both portable and wall types, manual or automatic control. Master Duty Wall Insert Type W shown above, at right. Thermador-Everhot Electric Water Heaters have been the standard for Quality and Performance for nearly 20 years. Type FW-30 illustrated at the right.

Architects! Write for the complete Thermador story. Full details, specification sheets and data upon request. Dept. R.

Type FW-30

THERMADOR ELECTRICAL MFG. CO.
116 Llewellyn Street . . . Los Angeles, Calif.
A SEVEN LEAGUE STEP IN THE SCIENCE OF ELECTRIC HEATING!

Also Makers of THERMADOR-EVERHOT

ELECTRIC ROOM HEATERS
ELECTRIC WATER HEATERS

signed to be placed beside a window, and has a telescopic duct connection in the rear from which outside air is drawn for introduction into the room, and also for cooling the refrigerant condenser. It is mounted on rubber-tired ball-bearing casters so that it can be rolled over polished floors without marring them. The new conditioner is intended especially for single room applications such as dentists' and doctors' offices, hotel and hospital rooms, private offices, homes, etc., and will be sold as an item of packaged merchandise by dealers and distributors.

D5-17
COOLING AND DEHUMIDIFYING COILS

By offering Standard Air Conditioning Coils for cooling and dehumidifying, the Fedders Manufacturing Company claims to simplify the selection and installation of this equipment. In a sense the Fedders Company is making this equipment available on a "package basis." A complete line, from one to one hundred horsepower, is in production. Among the engineering points of advantage mentioned in a catalog-data book just issued are these: exclusive method of assembling copper fins and tubes; metal to metal copper fins and copper tubes; electro tin plated silver-satin finish. The catalog-data book will be furnished on request.

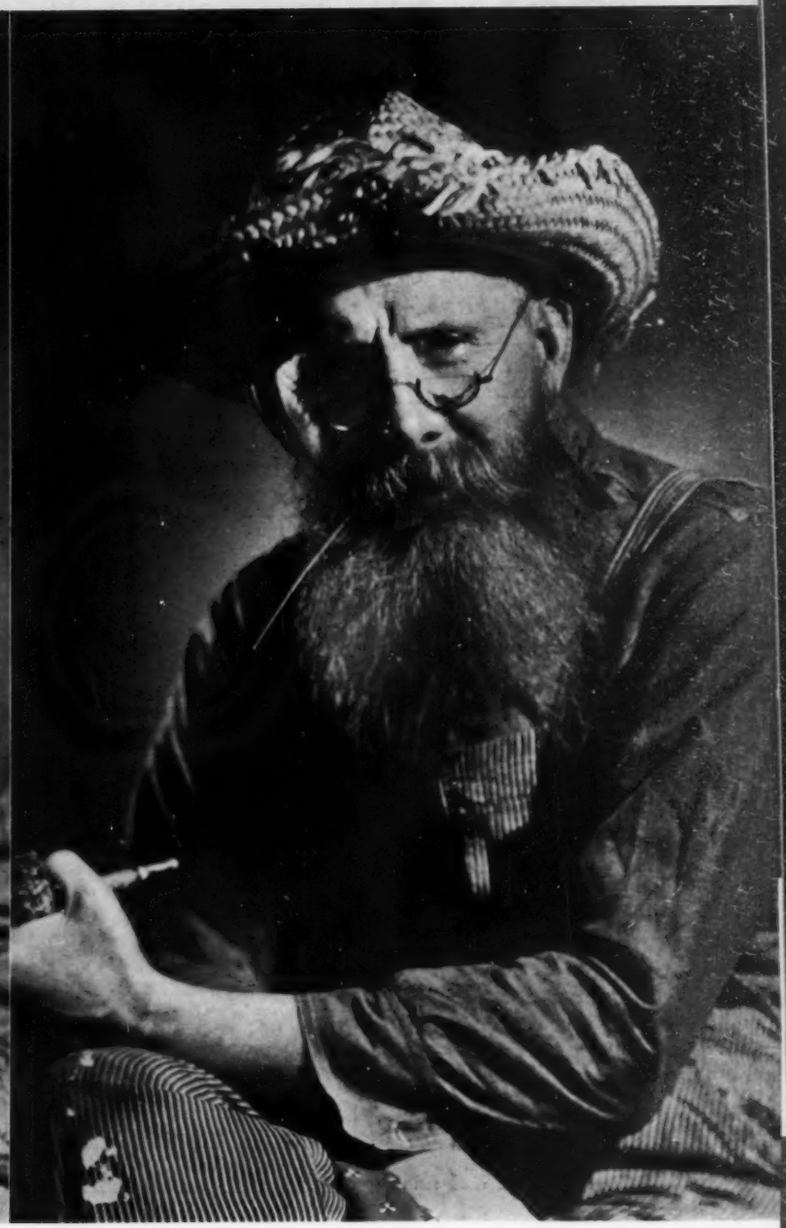
D5-18
THE GAR-WOOD BOILER

Claiming a higher temperature of fire than is found in the conventional type boiler the Gar-Wood Model R dispenses with water legs so that combustion chamber walls are carried clear to the shell

or crown sheet. These walls are backed by high temperature insulation and, according to the manufacturer's statement, absence of water legs is offset by radiation from combustion chamber walls. Higher temperature of fire is said to improve combustion of No. 3 oil.

Even the PHOTOGRAPHER *was stumped*

Even the photographer was stumped! John Paul Pennybaker, of Underwood & Underwood Illustration Studios, took these two photographs . . . one THROUGH a piece of L·O·F Quality Window Glass, and the other with NOTHING between the camera and the subject. When a proof of this page was shown to him EVEN HE COULDN'T TELL WHICH WAS WHICH.



● When the keenly critical eye of a camera fails to pick the slightest indication of distortion through a piece of window glass, that is surely obvious indication of extreme clearness and flatness. No technical test, to be sure, but a very practical demonstration of quality . . . evidence enough to explain why so many leading architects write a closed specification for it. To protect the architect, the client and the Libbey·Owens·Ford standard of quality, each light of L·O·F Quality Window Glass is plainly labeled. It is advisable to instruct contractors to leave the labels on.

Libbey·Owens·Ford Glass Company . . . Toledo, Ohio.

LIBBEY·OWENS·FORD
QUALITY GLASS

AUTOMATIC COAL FIRING

Cut-away illustration of Ring-Drive Iron Fireman which feeds direct from bin to fire. Bin and Bunker feed models, as well as Hopper models, available in all sizes.

The HEATING *of* TODAY *and TOMORROW*

THERE is now a definite swing to coal firing. But it is not a swing *back* to the old kind of coal firing—it is a swing *forward* to the new type of automatic self-regulating coal firing pioneered and developed by Iron Fireman.

Comparative fuel cost figures shown here explain why Iron Fireman fired coal is the preferred fuel. These figures represent the average costs for these 6 fuels in 40 of America's larger cities. They show that Iron Fireman costs 29.8% less than hand-fired coal; 46% less than crude oil; 65% less than diesel oil; 80% less than gas at industrial rates, and 85% less than gas at domestic rates. These figures are general averages but they square with actual fuel cost savings which Iron Fireman installations have achieved in thousands of cases, and it is easy to obtain actual comparative fuel cost figures for any locality—any Iron Fireman sales office will help you compile them. Get these figures and estimate how much your client's savings will amount to during the life of his building. The total saving is astonishing!

There are other points of superiority in Iron Fireman heating, however, which are fully as important as the remarkable economy. Combustion is so nearly perfect that there is no smoke. Temperature is automatically regulated. Only a minimum of labor is required. The boiler room can be kept just as clean as with any other fuel—the stack and outdoor even cleaner. Installations can be made to feed direct from the coal bunkers. You will want all the new data on Iron Fireman automatic coal firing.

***Comparative Fuel Costs**

Type of Fuel	Cost per 100,000 b.t.u.	Iron Fireman Saving
Iron Fireman Coal	**1.65c**	
Hand-Fired Coal	**2.35c**	**29.8%**
Crude Oil (Industrial)	**3.07c**	**46 %**
Diesel Oil (Domestic)	**4.80c**	**65 %**
Industrial Gas	**9.05c**	**80 %**
Domestic Gas	**11.78c**	**85 %**

*Figures are average cost in 40 leading American cities for amount of fuel required to furnish one Therm (100,000 British thermal units).

IRON FIREMAN

The machine that made coal an automatic fuel

Pencil Points-Iron Fireman Architectural Competition just announced. Literature and Don Graf Data Sheets available from Iron Fireman at 3134 W. 106th Street, Cleveland, Ohio.

IRON FIREMAN MANUFACTURING COMPANY, Cleveland, Ohio; Portland, Oregon; Toronto, Canada.

TRADE ANNOUNCEMENTS

JUNIUS H. STONE

Mr. Junius H. Stone, New York City, announces that he has severed his connection with the Cork Insulation Company and is reengaging in business under his own name at 270 Madison Avenue, New York, Suite 1606, where he will continue the business of cork and steel construction under the title "Corkanstele." Mr. Stone will continue also to handle insulation materials and cold storage contracts, in which he has specialized for many years.

REPUBLIC STEEL CORPORATION

Effective April 1, the Seattle, Washington, District Sales Office of Republic Steel Corp. was removed to the White-Henry-Stuart Bldg. C. D. Winter continues in charge of the office as District Sales Manager.

DELCO APPLIANCE CORPORATION

George W. Faurie has been appointed manager of Sales Education of the Delco-Heat Division of the Delco Appliance Corporation, subsidiary of General Motors.

BUCHER ELECTED VICE PRESIDENT OF THE WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY

At a meeting of the Board of Directors of the Westinghouse Electric & Manufacturing Company, George H. Bucher was elected a vice president of the company. He will make his headquarters in New York City. Mr. Bucher, who is also President and General Manager of the Westinghouse Electric International Company, has been connected with the Westinghouse organization since September 1, 1909.

NATIONAL COPPER PAINT COMPANY

Formation of the National Copper Paint Company, an Illinois corporation, to manufacture and market the newly evolved liquid paint of 98.3 per cent purity, is announced by C. L. Welch, executive vice-president. Headquarters are at 666 Lake Shore Drive, Chicago. President of the company is H. M. Rice, manager of the Nichols Copper Company, Chicago, a unit of the Phelps-Dodge Corporation. Frederick A. McLauchlan, president of George B. Carpenter & Co., Chicago, is secretary and treasurer.

READING IRON COMPANY

Accurate, disinterested advice about pipe problems to those who specify or buy pipe is the purpose of a new service announced at the Reading Iron Company's sales convention, recently held in Reading, Pa. The announcement concerned the formation of a Commercial Research Department, composed of skilled technicians, whose services are available, without charge, to the man who wants to be sure of putting the right pipe in the right place.